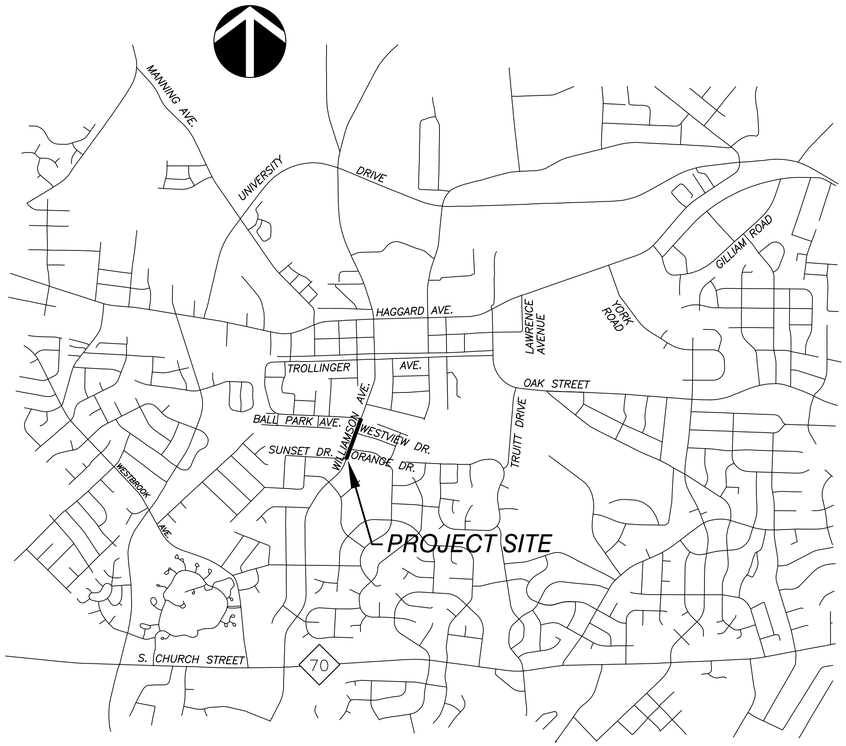
TOWN OF ELON
STREET & SIDEWALK IMPROVEMENTS
S. WILLIAMSON AVE. & BALL PARK AVE.

ALAMANCE COUNTY, ELON, NORTH CAROLINA
NCDOT PROJECT NO. : 43831



VICINITY MAP
NOT TO SCALE

OWNER
TOWN OF ELON

104 SOUTH WILLIAMSON AVENUE
ELON, NORTH CAROLINA 27244
TELEPHONE : (336) 584-0282

TOWN MANAGER : RICHARD J. WHITE, III
TOWN ATTORNEY: JOESPH J. KALO
TOWN CLERK: DIANNE ENOCH

INDEX OF SHEETS

DATE: JANUARY 16, 2014

ALLEY, WILLIAMS, CARMEN, & KING, INC.
ENGINEERS & ARCHITECTS
740 CHAPEL HILL ROAD
BURLINGTON, NORTH CAROLINA 27215
TELEPHONE: 336-226-5534

FIRM'S ENGINEERING LICENSE NO. F-0203

NORTH CAROLINA PROFESSIONAL SEAL 12634 ENGINEER MARK D. REICH

DocuSigned by: Mark D. Reich 58637F049ADB4D7... 4/22/2015

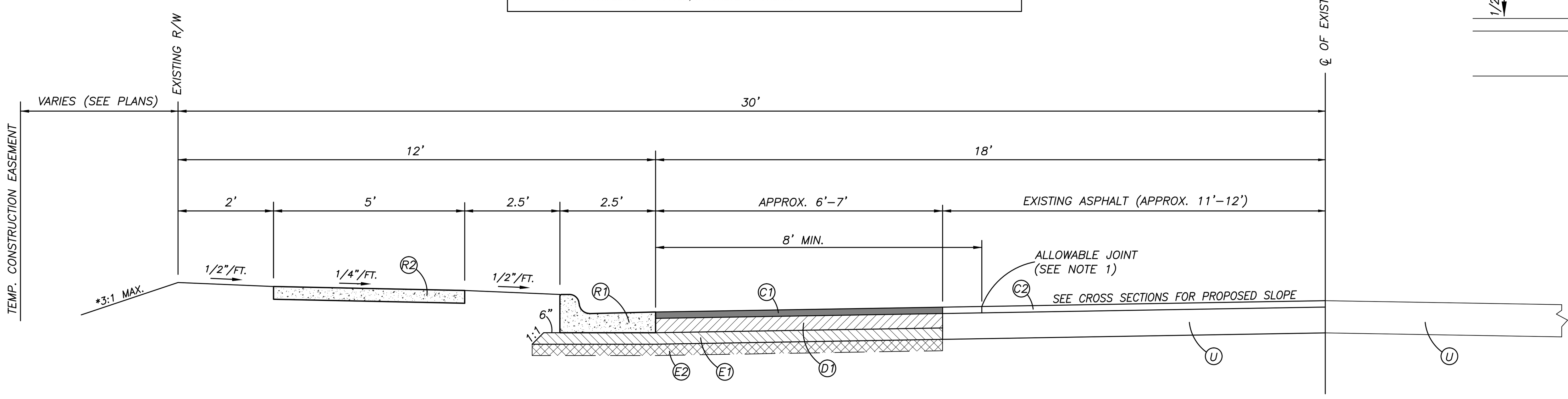
JOB NO. 12190

REVISED : 4/17/15 - RELEASED FOR CONSTRUCTION
REVISED : 5/05/14 - NCDOT COMMENTS

PAVEMENT SCHEDULE

C1	PROPOSED APPROXIMATE 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQUARE YARD IN EACH OF TWO LAYERS (SEE NOTE 1).
C2	MILL EXISTING PAVEMENT FROM EDGE OF PAVEMENT TO CENTERLINE TO AN APPROXIMATE DEPTH OF 1.5". PROPOSED APPROXIMATE 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS/IN THICK PER SQUARE YARD (SEE NOTE 1).
D1	PROPOSED APPROXIMATE 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I 19.0 B, AT AN AVERAGE RATE OF 456 LBS. PER SQUARE YARD.
E1	PROPOSED APPROXIMATE 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQUARE YARD.
E2	PROPOSED SHALLOW UNDERCUT TO STABLE SUBGRADE AS DIRECTED BY ENGINEER. PROPOSED X-INCHES ASPHALT CONCRETE BASE COURSE, TYPE B 25.0B AT AN AVERAGE RATE OF 114 LBS/IN THICK PER SQUARE YARD. MAXIMUM LIFT THICKNESS OF B 25.0B IS 5.5 INCHES.
R1	2'-6" CONCRETE CURB & GUTTER, NCDOT STD. 846.01
R2	5'-0" CONCRETE SIDEWALK, 4" THICK
U	EXISTING PAVEMENT

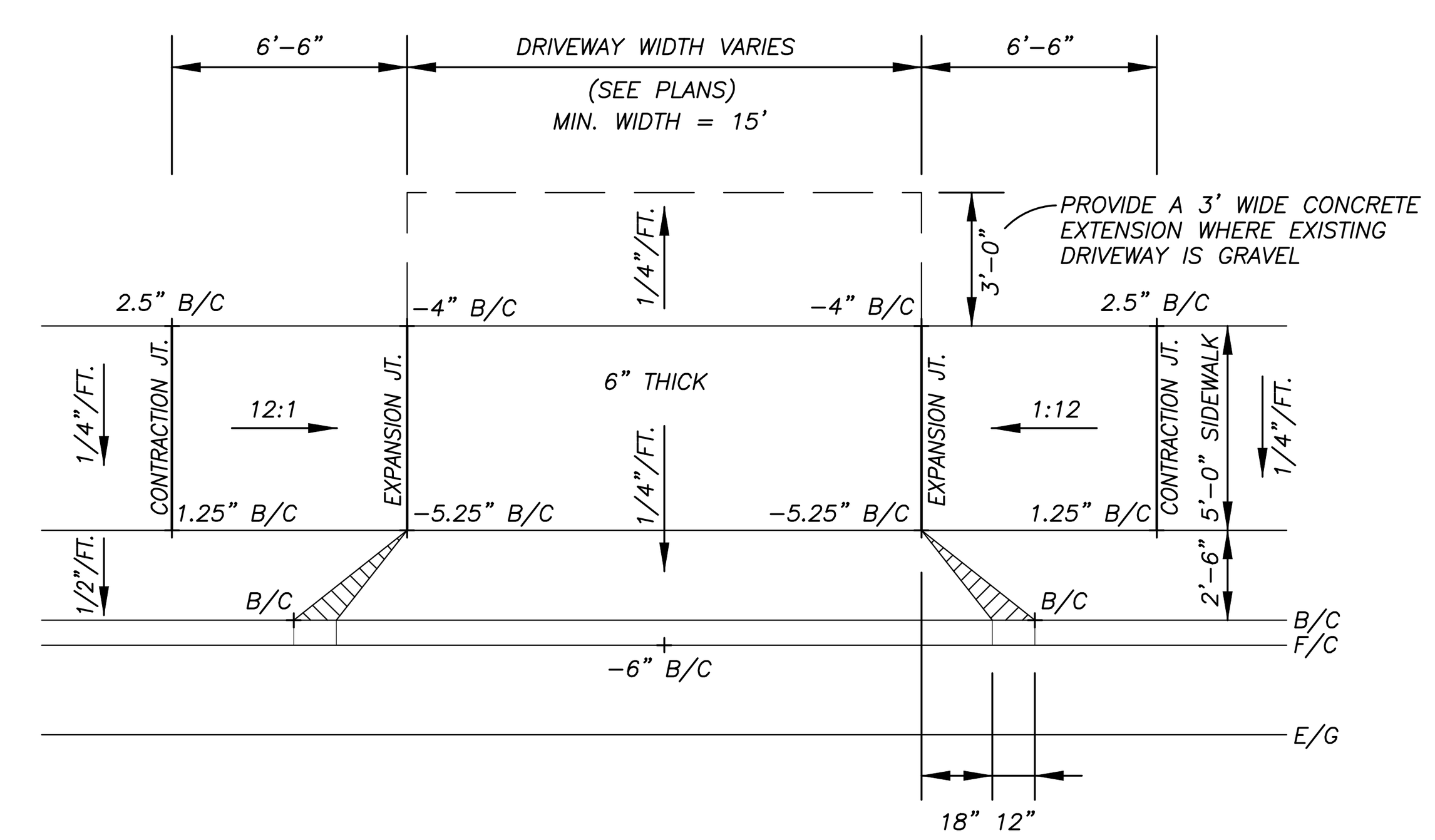
NOTE: 1. PROVIDE JOINT IN FINAL SURFACE LAYER A MINIMUM OF 12" ONTO EXISTING PAVEMENT OR A MINIMUM OF 8 FT. FROM EDGE OF GUTTER; WHICHEVER IS GREATER.



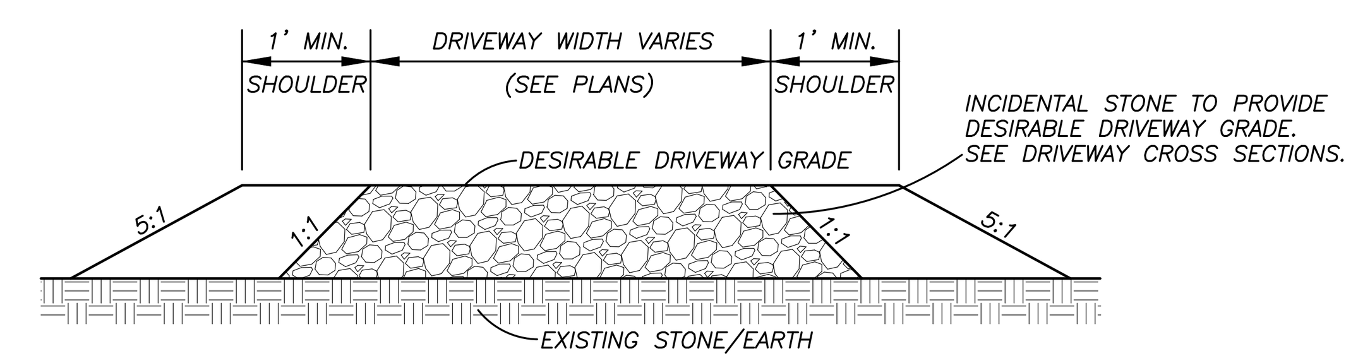
TYPICAL SECTION - S. WILLIAMSON AVENUE

STATION 0+00 TO STATION 10+25±

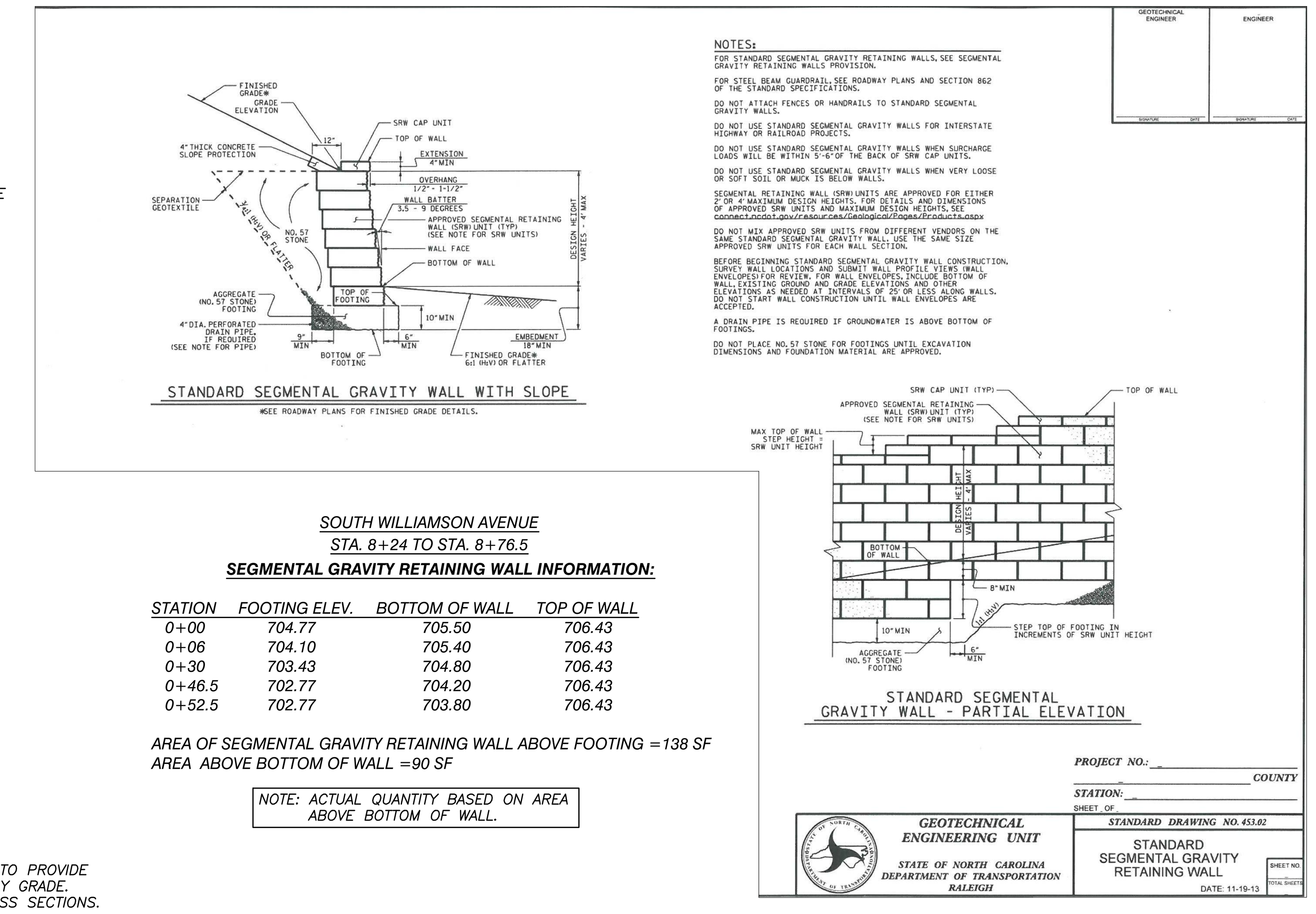
*SEE CROSS SECTIONS FOR SLOPE VARIANCES



TYPICAL DRIVEWAY DETAIL



TYPICAL DRIVEWAY REPAIR SECTION

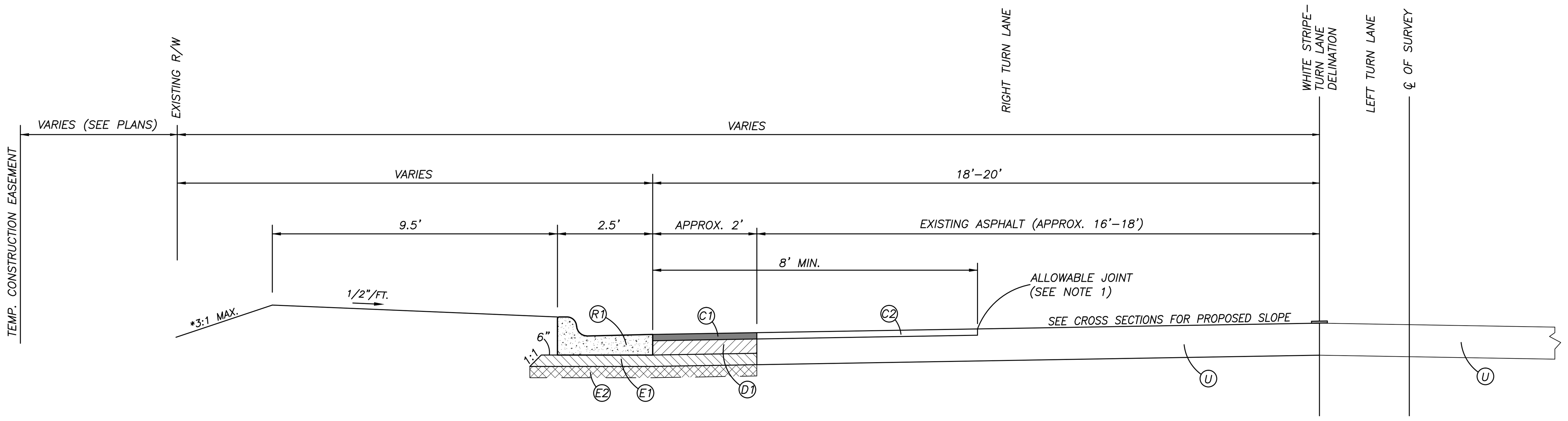


SOUTH WILLIAMSON AVENUE
STA. 8+24 TO STA. 8+76.5
SEGMENTAL GRAVITY RETAINING WALL INFORMATION:

STATION	FOOTING ELEV.	BOTTOM OF WALL	TOP OF WALL
0+00	704.77	705.50	706.43
0+06	704.10	705.40	706.43
0+30	703.43	704.80	706.43
0+46.5	702.77	704.20	706.43
0+52.5	702.77	703.80	706.43

AREA OF SEGMENTAL GRAVITY RETAINING WALL ABOVE FOOTING =138 SF
AREA ABOVE BOTTOM OF WALL =90 SF

NOTE: ACTUAL QUANTITY BASED ON AREA ABOVE BOTTOM OF WALL.



TYPICAL SECTION - BALL PARK AVENUE

STATION 0+00 TO STATION 1+19

*SEE CROSS SECTIONS FOR SLOPE VARIANCES

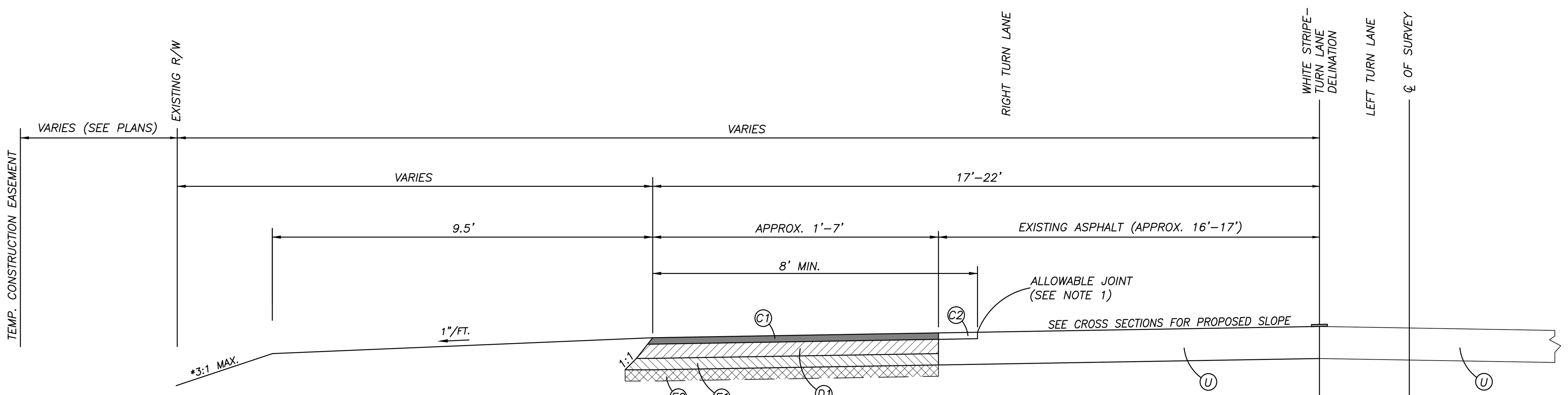
GUTTER SPREAD CALCULATIONS

INLET #	DRAINAGE AREA (ac)	SLOPE (LONG)	SLOPE (ROAD)	SLOPE (GUTTER)	Max Spread	Gutter Width	Max Depth	A (sf)	Pw (ft)	Hydraulic Radius	Q @ Max Spread (cfs)	Actual Q(25) for Inlet	Difference between Max Spread Q and Actual Q
CB 3	0.20	SAG	2.10%	4.20%	8	2	0.21	0.714	8.21	0.0870		1.12	ACCEPTABLE
CB 2	0.10	0.50%	2.10%	4.20%	8	2	0.21	0.714	8.21	0.0870	0.98	0.56	0.42
CB 6	0.30	SAG	2.10%	4.20%	8	2	0.21	0.714	8.21	0.0870		1.68	ACCEPTABLE
CB 5	0.15	0.60%	2.10%	4.20%	8	2	0.21	0.714	8.21	0.0870	1.08	0.84	0.24
CB 12	0.08	0.50%	2.10%	4.20%	8	2	0.21	0.714	8.21	0.0870	0.98	0.44	0.54
CB 11	0.06	3.30%	2.10%	4.20%	8	2	0.21	0.714	8.21	0.0870	2.52	0.34	2.18
CB 10	0.03	2.10%	2.10%	4.20%	8	2	0.21	0.714	8.21	0.0870	2.01	0.17	1.84

STORM SEWER CHART

Structure # Up	Structure # Down	Drainage Area (ac)	Total Area (ac)	Runoff Coeff (C)	Tc (min)	I 25 (in/hr)	Incr Q (cfs)	Flow Rate (cfs)	Capacity Full (cfs)	Pipe Size (in)	Pipe Length (ft)	Pipe Slope (%)	Velocity Avg (ft/s)	Invert Up (ft)	Invert Down (ft)	Rim Elev Up (ft)	Rim Elev Down (ft)	HGL Up (ft)	HGL Down (ft)
CB # 3	CB # 2	0.20	0.20	0.90	10.0	6.24	1.12	1.12	5.18	15.00	34.17	0.64	0.92	701.90	701.68	705.35	705.47	703.25	703.24
EX P.I.	CB # 2	2.52	2.52	0.40	10.0	6.24	6.29	6.29	11.86	18.00	39.19	1.28	4.07	702.18	701.68	N/A	705.47	703.27	703.24
CB # 2	PE # 1	0.10	2.82	0.90	10.0	6.24	0.56	7.97	4.80	18.00	24.00	0.21	5.06	701.65	701.60	705.47	N/A	703.10	702.77
CB # 6	CB # 5	0.30	0.30	0.90	10.0	6.24	1.68	1.68	5.31	15.00	59.25	0.68	1.37	701.33	700.93	704.66	704.97	703.12	703.08
EX P.I.	CB # 5	5.20	5.20	0.45	10.0	6.24	14.60	14.60	11.78	18.00	46.07	1.26	8.26	701.51	700.93	N/A	704.97	703.97	703.08
CB # 5	PE # 4	0.15	5.65	0.90	10.0	6.24	0.84	17.12	41.30	24.00	24.00	3.33	6.20	700.40	699.60	704.97	N/A	701.87	701.88
EX. P.I.	CB # 12	1.11	1.11	0.60	10.0	6.24	4.61	4.61	26.96	18.00	46.48	5.62	5.63	703.75	701.14	N/A	705.58	704.57	701.76
CB # 12	CB # 11	0.08	1.19	0.90	10.3	6.17	0.50	5.06	17.43	18.00	51.14	2.35	5.07	700.90	699.70	705.58	703.51	701.76	700.49
CB # 11	CB # 10	0.06	1.25	0.90	10.6	6.10	0.37	5.37	17.49	18.00	33.85	2.36	6.80	699.60	698.80	703.51	702.80	700.49	699.37
EX CB	CB # 10	1.52	1.52	0.85	10.0	6.24	8.94	8.94*1	11.62	18.00	38.36	1.04	6.68	699.46	699.06	703.21	702.80	700.62	700.05
CB # 10	DI # 9	0.03	2.80	0.90	10.8	6.05	0.19	14.24	34.68	24.00	122.82	2.00	8.38	697.32	694.86	702.80	698.73	698.68	695.75
DI # 9	DI # 8	0.25	3.05	0.65	11.2	5.95	1.12	15.11	21.97	24.00	115.68	0.80	6.44	694.23	693.30	698.73	697.25	695.63	694.70
DI # 8	PE #7	0.60	3.65	0.60	11.6	5.87	2.49	17.28	21.96	24.00	136.99	0.80	6.18	693.20	692.10	697.25	N/A	694.70	694.10

NOTE 1:
DISCHARGE BASED ON DRAINAGE AREA OF UPSTREAM EXISTING NETWORK & EXCLUDES DRAINAGE AREA FROM UPSTREAM DETENTION PONDS. FLOW FROM DETENTION PONDS OCCURS APPROXIMATELY 10 MINUTES AFTER PEAK FLOW FROM NETWORK. PEAK DISCHARGE FROM PONDS IS 14.35 CFS FOR 25 YEA



TYPICAL SECTION - BALL PARK AVENUE

STATION 1+19 TO STATION 2+30

*SEE CROSS SECTIONS FOR SLOPE VARIANCES

PIPE REMOVAL SUMMARY

STATION	LOCATION	LENGTH	SIZE	REMARKS
2+09	CB # 2	4	18" RCP	REMOVE EXIST 18" RCP TO CONSTRUCT PROP CB
3+00	LT	23	12" RCP	REMOVE DRIVEWAY PIPE
4+80	LT	21	15" RCP	REMOVE DRIVEWAY PIPE
5+21	CB # 5	4	18" RCP	REMOVE EXIST 18" RCP TO CONSTRUCT PROP CB
5+32	LT	20	15" RCP	REMOVE DRIVEWAY PIPE
6+30	LT	20	12" RCP	REMOVE DRIVEWAY PIPE
1+05 BP	CB # 10	6	18" RCP	REMOVE EXIST 18" RCP TO CONSTRUCT PROP CB

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12634 MARK D. REICH
DocuSigned by: Mark D. Reich
4/22/2015

REVISED : 4/17/15 - RELEASED FOR CONSTRUCTION
REVISED : 4/17/15 - REVISED TYPICAL DRIVEWAY SECTION
REVISED : 5/05/14 - REVISED STORM DRAIN CHART & ADDED GUTTER SPREAD CALCS.

PROPOSED STREET & SIDEWALK IMPROVEMENTS FOR

TOWN OF ELON

ELON, NORTH CAROLINA
BOONE STATION TOWNSHIP, ALAMANCE COUNTY, NC

alley, williams, carmen & king, inc.
ENGINEERS, ARCHITECTS & SURVEYORS
740 chapel hill road, burlington, n.c. 27215
p.o. box 1179, 336/226-5534
Firm's Engineering License No. F-0203

DATE: 1/16/14	TYPICAL SECTIONS	JOB NO. 12190
DRAWN BY: WDF		DWG NAME: 12190BASE.DWG
CHECKED BY: MDR		SHEET NO. 2 of 17

THIS PLAN DOES NOT PURPORT TO SHOW ALL EXISTING UTILITIES, LINES, APPURTENANCES, ETC., AND THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES, PIPES, VALVES, ETC. AS SHOWN ARE IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR THE ENGINEER/ARCHITECT. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES, LINES, PIPES, ETC. BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT RESULT FROM THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES, PIPES AND VALVES. THE CONTRACTOR SHALL NOTIFY THE ENGINEER/ARCHITECT OF ANY CONFLICTS WITH EXISTING AND PROPOSED FACILITIES TO DETERMINE IF AN ITEM WILL NEED TO BE RELOCATED.

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CONTRACTOR SHALL COORDINATE ALL FIRE HYDRANT, WATER METER & SANITARY SEWER CLEANOUT ADJUSTMENTS WITH TOWN OF ELON PUBLIC WORKS DEPARTMENT. CONTACT DON WAGONER AT 336-584-9600.

SEE CROSS SECTIONS FOR DRIVEWAY PROFILES

DENOTES 6" THICK CONCRETE ALL DRIVEWAY CONCRETE SHALL BE HIGH EARLY MIX, SEE PROJECT PROVISIONS.

SEE SHEET 14 FOR CONSTRUCTION SEQUENCE

TOTAL DISTURBED AREA - 0.94 ACRES ±

LEGEND

Symbol	Description	Symbol	Description
○	EIP	CO	CLEAN OUT
×	CALCULATED POINT		CURB INLET
	LAMP POST		GRATE INLET
S	SANITARY SEWER MANHOLE		YARD INLET
PP	POWER POLE	MW	MONITORING WELL
LP	LIGHT POLE		LANDSCAPE LIGHT
WM	WATER METER	B	BOLLARDS
WV	WATER VALVE	GTS	GAS TESTING STATION
	FIRE HYDRANT	TPED	TELEPHONE PEDESTAL

CONSTRUCTION REQUIREMENTS BETWEEN STA. 2+50 & STA. 3+75:

1. CONTRACTOR SHALL NOT DISTURB OR DAMAGE ROCK FOUNTAINS ON EACH SIDE OF DRIVEWAY.
2. INSTALL SILT FENCE ON CURB SIDE OF FOUNTAIN AS DIRECTED BY ENGINEER.
3. PROVIDE WATTLES ALONG EDGE OF CONCRETE PAD (NORTH OF DRIVEWAY) ADJACENT TO FILL, SECURE/STABILIZE WATTLES WITHOUT DAMAGING CONCRETE PAD AND AS DIRECTED BY ENGINEER.
4. TRANSITION FILL SLOPE FROM 3:1 TO 2:1 & SHOULDER WIDTH FROM 2' TO 1' ON SOUTH SIDE OF FOUNTAIN (APPROX. STA. 2+65). TRANSITION SHOULDER WIDTH FROM 1' TO 2' ON NORTH SIDE OF FOUNTAIN (APPROX. STA. 2+75), MAINTAINING 2:1 FILL SLOPE TO SOUTH SIDE OF DRIVEWAY.
5. NORTH OF DRIVEWAY TO NORTHERN PROPERTY LINE, PROVIDE 2' WIDE SHOULDER AND 2:1 FILL SLOPE, TRANSITIONING BACK TO A 3:1 SLOPE BETWEEN STA. 3+50 AND 3+75.
6. ADJUST EXISTING ELECTRICAL OUTLETS TO FINISH GRADE IN ACCORDANCE WITH NORTH CAROLINA ELECTRICAL CODE. WORK TO BE PERFORMED BY LICENSED ELECTRICAL CONTRACTOR.
7. REMOVE EXISTING WOOD FENCE. SALVAGE ALL MATERIALS, STACK ALL MATERIALS IN A NEAT & STABLE MANNER IN AREA DESIGNATED BY PROPERTY OWNER. SECURE STORED MATERIALS BY INSTALLING SAFETY FENCE AROUND MATERIALS.
8. REINSTALL WOOD FENCE AFTER FINAL GRADE IS ESTABLISHED. INSTALL FENCE APPROXIMATELY 2' FROM EDGE OF CONCRETE SIDEWALK. FENCE TO BE INSTALLED PLUMB & UNIFORMLY AND TO A CONDITION AS GOOD OR BETTER THAN PRIOR TO REMOVAL. REPLACE ANY COMPONENTS DAMAGED DURING REMOVAL, STORING & REPLACEMENT PROCESS.

GENERAL NOTES:

1. ALL MATERIALS AND WORKMANSHIP SHALL COMPLY WITH NCDOT STANDARD SPECIFICATIONS AND DETAIL DRAWINGS.
2. CONCRETE MIX DESIGN SHALL BE AIR ENTRAINED AND SHALL BE AN APPROVED NCDOT DESIGN MIX.
3. WHEN NECESSARY, RELOCATE ROADWAY SIGNS.
4. ADJUST UTILITIES, VALVES, METER BOXES AND MANHOLES AS REQUIRED TO MATCH SIDEWALK GRADE. ADJUSTMENTS BY TOWN OF ELON.
5. ALL SIDEWALKS SHALL BE IN COMPLIANCE WITH ADA REQUIREMENTS.

SCALE: 1" = 20'

0' 20' 40' 60' 80' 100'

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12634 MARK D. REICH
DocuSigned by: Mark D. Reich
4/22/2015

REVISED : 4/17/15 - RELEASED FOR CONSTRUCTION
REVISED : 4/17/15 - ADDED 3' CONC. STRIP @ GRAVEL DRIVEWAYS
REVISED : 5/05/14 - NCDOT COMMENTS

PROPOSED STREET & SIDEWALK IMPROVEMENTS FOR

TOWN OF ELON

ELON, NORTH CAROLINA
BOONE STATION TOWNSHIP, ALAMANCE COUNTY, NC

alley, williams, carmen & king, inc.
ENGINEERS, ARCHITECTS & SURVEYORS
740 chapel hill road, burlington, n.c. 27215
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DATE: 1/16/14	S. WILLIAMSON AVENUE STREET & SIDEWALK IMPROVEMENTS (FROM SUNSET DRIVE TO BALL PARK AVENUE)	JOB NO. 12190
DRAWN BY: WDF		DWG NAME: 12190BASE.DWG
CHECKED BY: MDR		SHEET NO. 3 of 17

THIS PLAN DOES NOT PURPORT TO SHOW ALL EXISTING UTILITIES, LINES, APPURTENANCES, ETC., AND THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES, PIPES, VALVES, ETC. AS SHOWN ARE IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR THE ENGINEER/ARCHITECT. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES, LINES, PIPES, ETC. BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT RESULT FROM THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES, PIPES AND VALVES. THE CONTRACTOR SHALL NOTIFY THE ENGINEER/ARCHITECT OF ANY CONFLICTS WITH EXISTING AND PROPOSED FACILITIES TO DETERMINE IF AN ITEM WILL NEED TO BE RELOCATED.

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SEE SHEET 14 FOR CONSTRUCTION SEQUENCE

TOTAL DISTURBED AREA - 0.94 ACRES ±

LEGEND

Symbol	Description	Symbol	Description
○	EIP	CO	CLEAN OUT
×	CALCULATED POINT		CURB INLET
	LAMP POST		GRATE INLET
(S)	SANITARY SEWER MANHOLE		YARD INLET
PP	POWER POLE	MW	MONITORING WELL
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WV	WATER VALVE	GTS	GAS TESTING STATION
	FIRE HYDRANT	TPED	TELEPHONE PEDESTAL

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5. ALL SIDEWALKS SHALL BE IN COMPLIANCE WITH ADA REQUIREMENTS.

SCALE: 1" = 20'

0' 20' 40' 60' 80' 100'

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12634 MARK D. REICH
DocuSigned by: Mark D. Reich 58637F049ADB4D7...
4/22/2015

REVISED : 4/21/15 - REVISED CROSSWALK ALIGNMENT
REVISED : 4/17/15 - RELEASED FOR CONSTRUCTION
REVISED : 4/17/15 - ADDED 3' CONC. STRIP @ GRAVEL DRIVEWAYS & CURB RAMP REVISIONS
REVISED : 5/05/14 - NCDOT COMMENTS

PROPOSED STREET & SIDEWALK IMPROVEMENTS FOR

TOWN OF ELON

ELON, NORTH CAROLINA
BOONE STATION TOWNSHIP, ALAMANCE COUNTY, NC

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DRAWN BY: WDF		DWG NAME: 12190BASE.DWG
CHECKED BY: MDR		SHEET NO. 4 of 17

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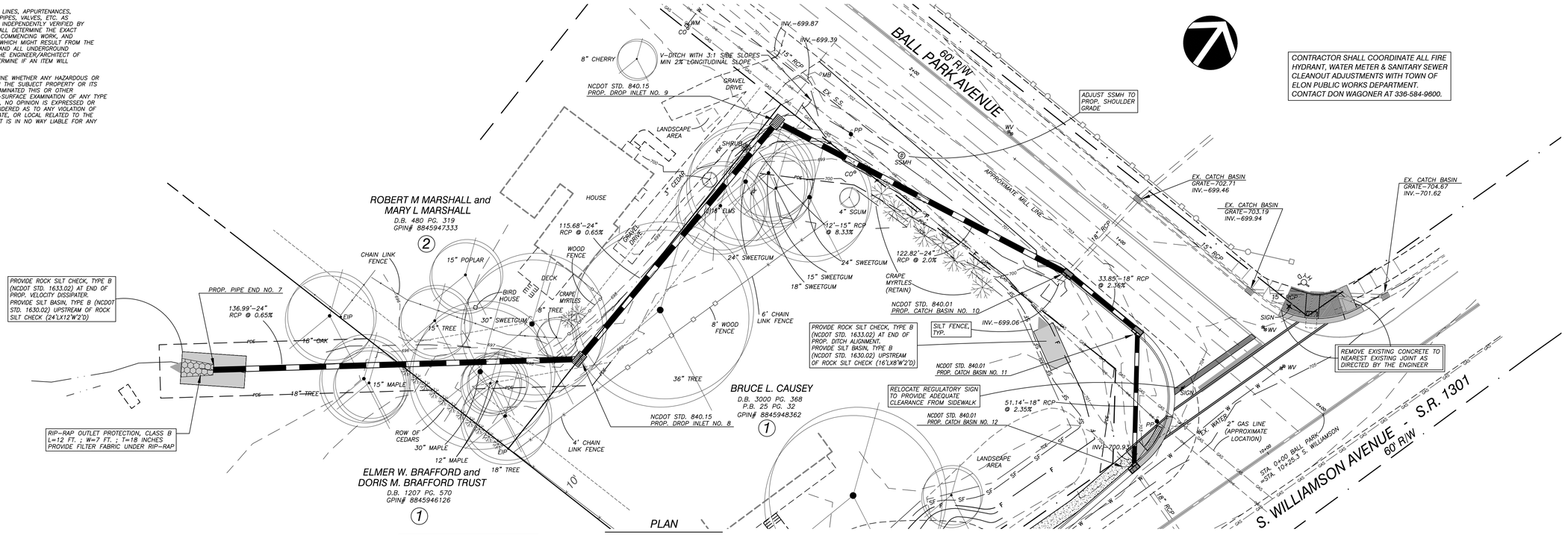
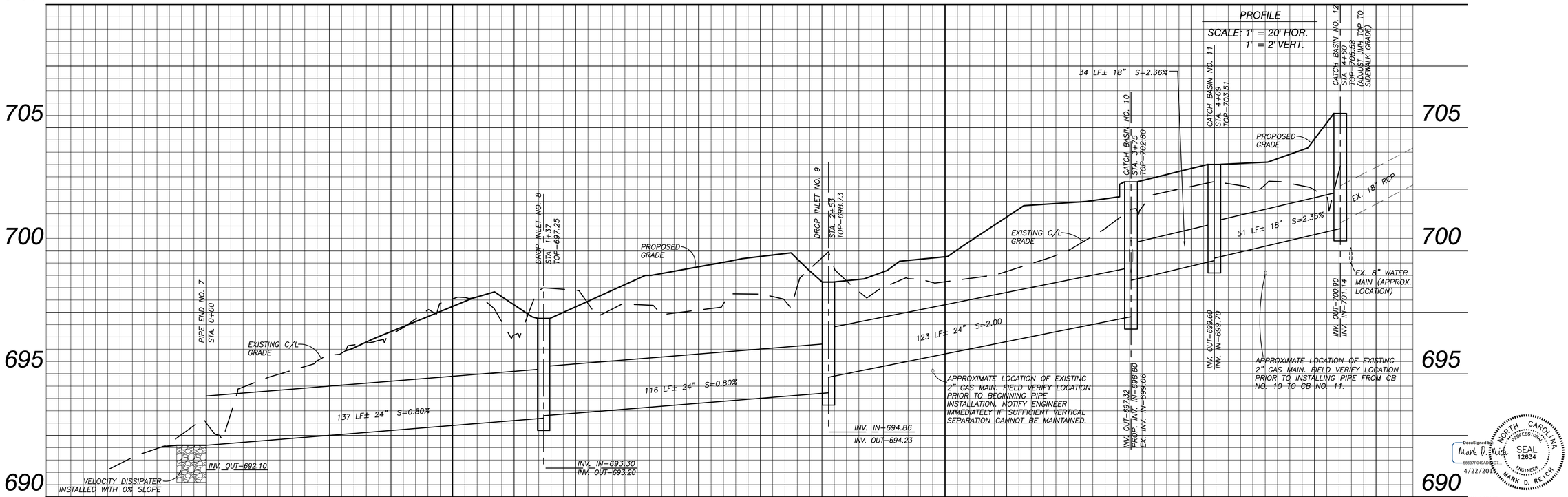




REVISED : 4/21/15 - REVISED CROSSWALK ALIGNMENT
REVISED : 4/17/15 - RELEASED FOR CONSTRUCTION & CURB RAMP REVISIONS
REVISED : 5/05/14 - NCDOT COMMENTS

alley, williams, carmen & king, inc.
ENGINEERS, ARCHITECTS & SURVEYORS
740 chapel hill road p.o. box 1179
burlington, n.c. 27215 336/226-5534
Firm's Engineering License No. F-0203

S. WILLIAMSON AVENUE & BALL PARK AVENUE
BOONE STATION TOWNSHIP – ELON, NORTH CAROLINA

BOOK NO. 431

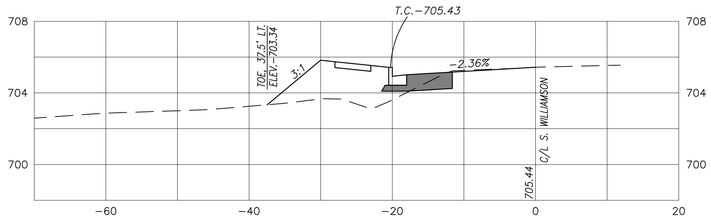
STREET & SIDEWALK IMPROVEMENTS
ELON, NORTH CAROLINA

DATE: 1/16/14
COMP FILE: 12190BASE.DWG
DRAWN BY: WDF
CHECKED BY: MDR

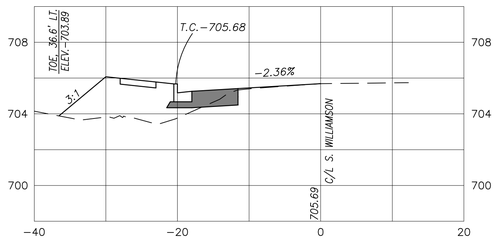
BALL PARK AVENUE STREET & SIDEWALK IMPROVEMENTS
(FROM S. WILLIAMSON AVENUE TO ±250' WEST OF S. WILLIAMSON AVENUE)

JOB NO. 12190
SHEET NO. 5
OF: 17

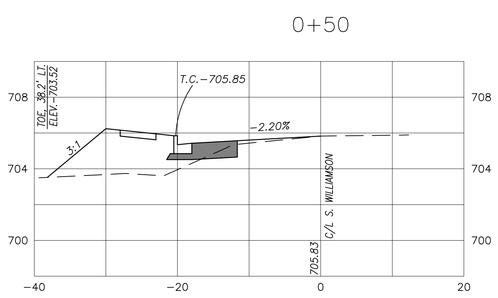
1+50



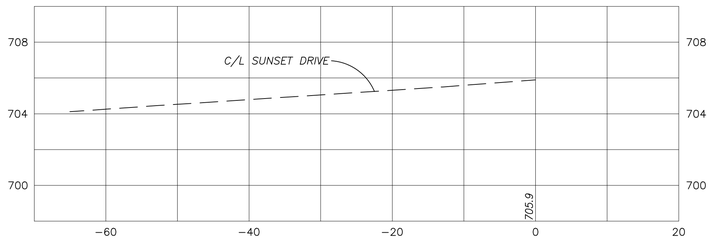
1+00



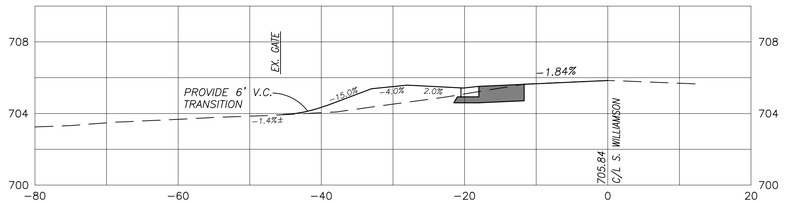
0+50



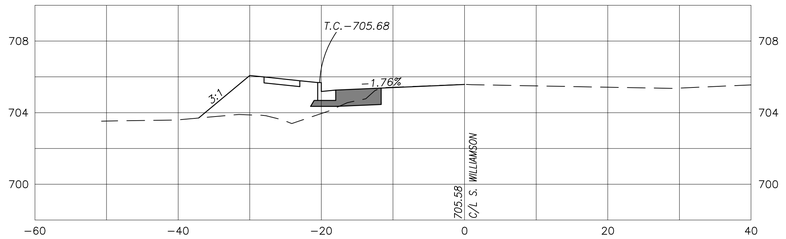
0+00



3+00

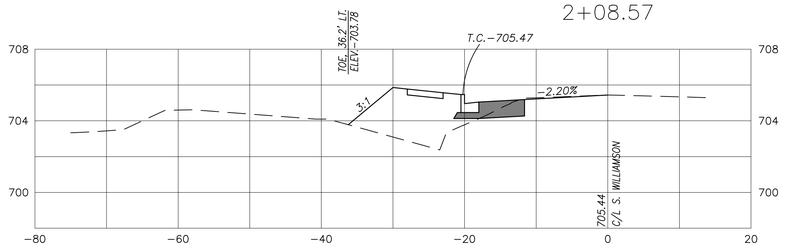


2+50



TRANSITION FROM 3:1 SLOPE TO 2:1 SLOPE & 1' WIDE SHOULDER SOUTH OF EXISTING FOUNTAIN, STA. 2+65

2+08.57



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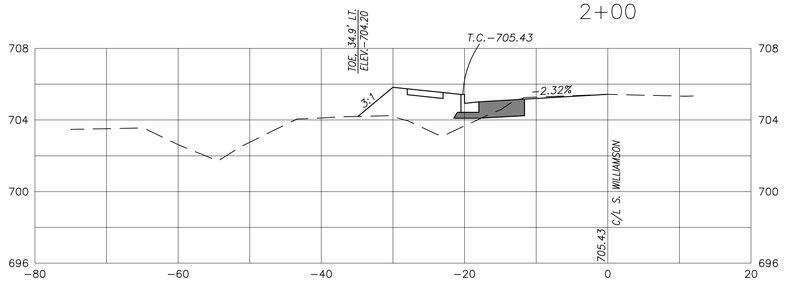


SCALES

HORIZONTAL: 1" = 10'
VERTICAL: 1" = 4'

SEAL 12634 — NORTH CAROLINA PROFESSIONAL ENGINEER — MARK D. REITH

DocuSigned by: Mark D. Reith 4/22/2015

REVISED : 4/17/15 - RELEASED FOR CONSTRUCTION

PROPOSED STREET & SIDEWALK IMPROVEMENTS FOR

TOWN OF ELON

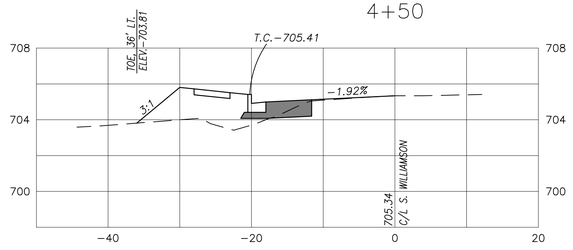
ELON, NORTH CAROLINA
BOONE STATION TOWNSHIP, ALAMANCE COUNTY, NC

alley, williams, carmen & king, inc.
ENGINEERS, ARCHITECTS & SURVEYORS
740 chapel hill road p.o. box 1179
burlington, n.c. 27215 336/226-5534
Firm's Engineering License No. F-0203

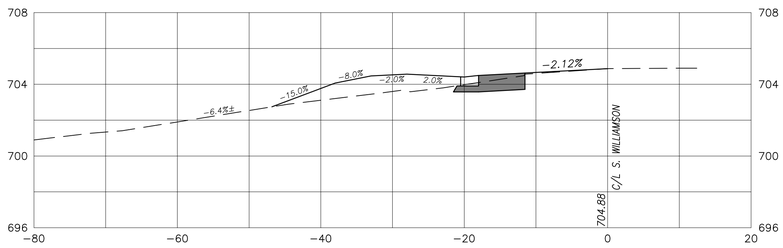
DATE: 1/16/14	JOB NO. 12190
DRAWN BY: WDF	DWG NAME: 12190BASE.DWG
CHECKED BY: MDR	SHEET NO. 7 OF 17

S. WILLIAMSON AVENUE
CROSS SECTIONS

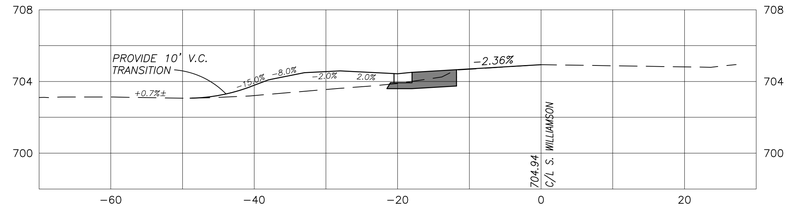
4+50



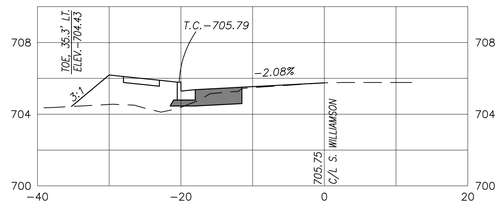
5+32.11



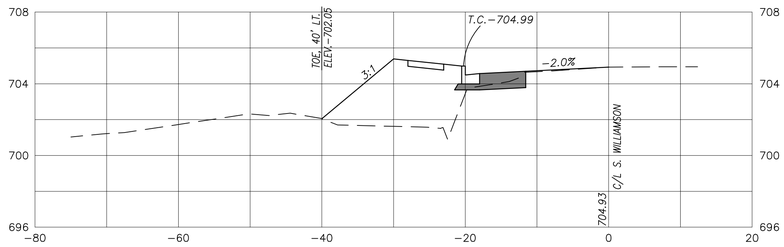
6+30.25



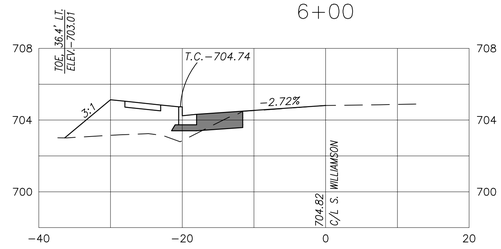
4+00



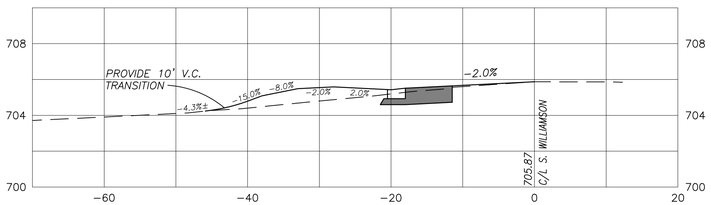
5+20.04



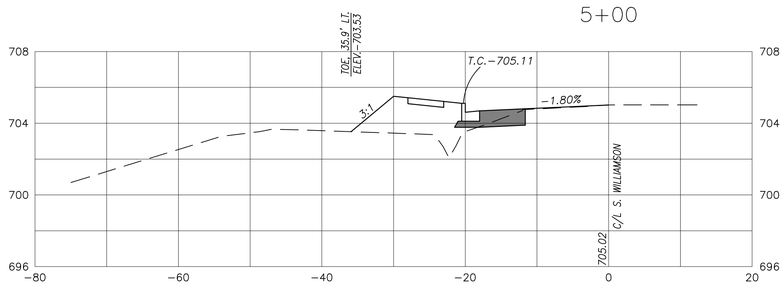
6+00



3+82.62



5+00



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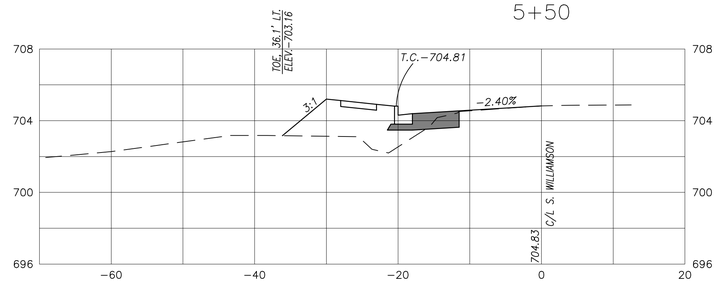
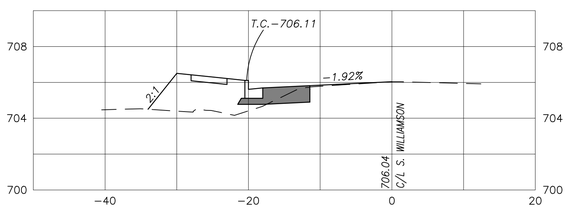
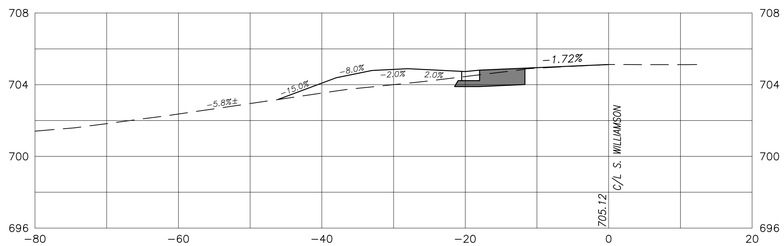


3+50



TRANSITION FROM 2:1 SLOPE TO 3:1 SLOPE BETWEEN STA. 3+50 & STA. 3+75

4+80.15



SCALES

HORIZONTAL: 1" = 10'
VERTICAL: 1" = 4'

REVISED : 4/17/15 - RELEASED FOR CONSTRUCTION

NORTH CAROLINA PROFESSIONAL SEAL 12634 ENGINEER MARK D. REICH

DocuSigned by: Mark D. Reich 4/22/2015

PROPOSED STREET & SIDEWALK IMPROVEMENTS FOR

TOWN OF ELON

ELON, NORTH CAROLINA
BOONE STATION TOWNSHIP, ALAMANCE COUNTY, NC

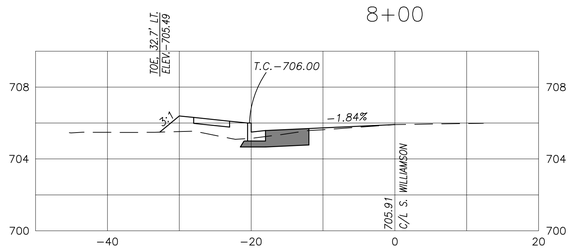
alley, williams, carmen & king, inc.
ENGINEERS, ARCHITECTS & SURVEYORS
740 chapel hill road p.o. box 1179
burlington, n.c. 27215 336/226-5534
Firm's Engineering License No. F-0203

DATE: 1/16/14
DRAWN BY: WDF
CHECKED BY: MDR

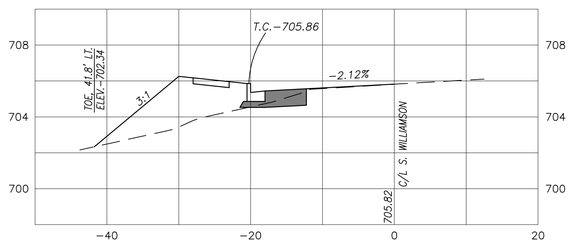
S. WILLIAMSON AVENUE CROSS SECTIONS

JOB NO. 12190
DWG NAME: 12190BASE.DWG
SHEET NO. 8 of 17

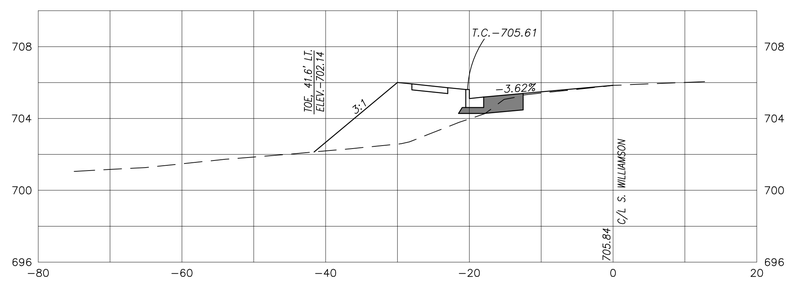
8+00



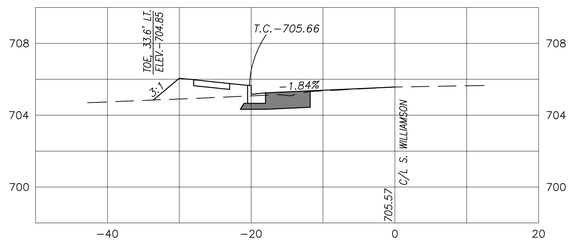
9+00



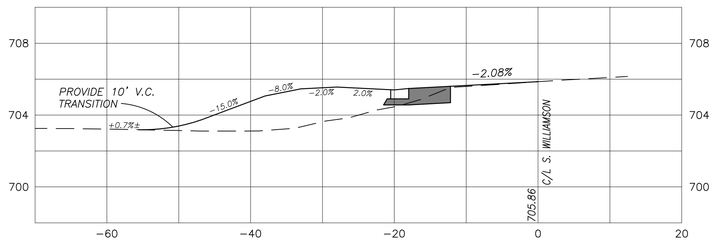
9+50



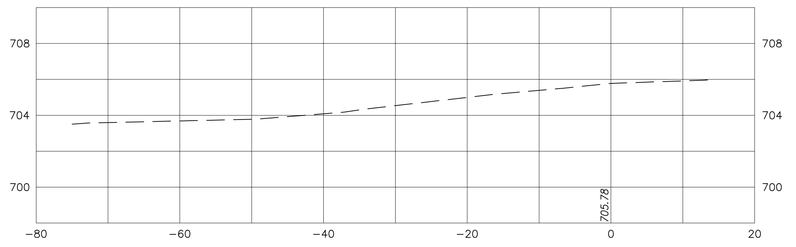
7+50



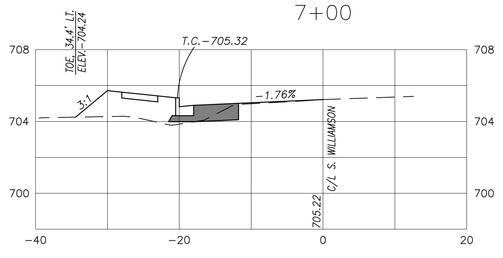
8+91.79



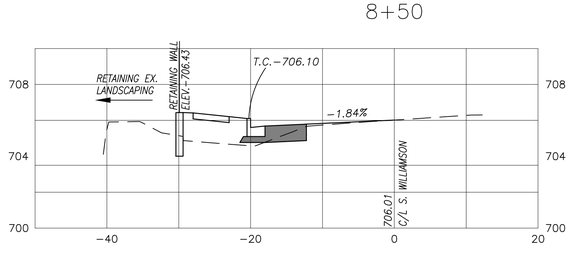
10+00



7+00

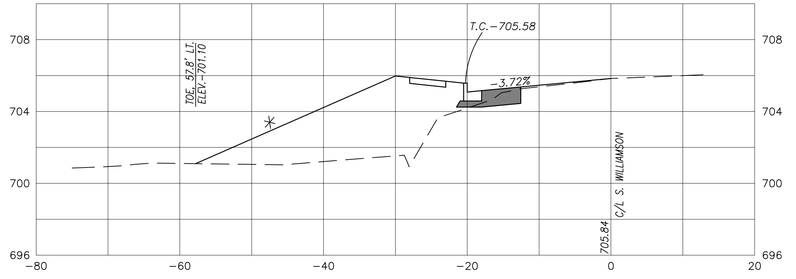


8+50

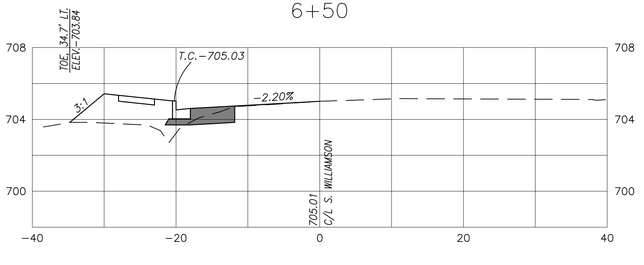


*EXTEND FILL SLOPE AS DIRECTED BY ENGINEER TO PROVIDE POSITIVE DRAINAGE FROM TOE OF SLOPE FROM S. WILLIAMSON AVE. TO STA. 1+00 ON BALL PARK AVENUE.

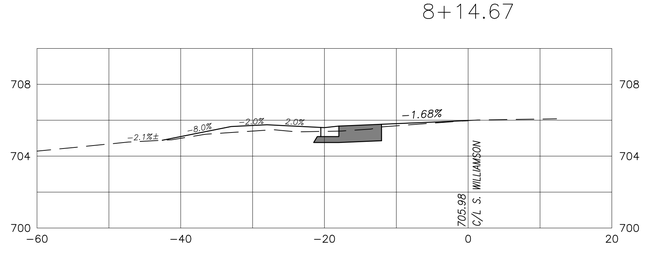
9+56



6+50



8+14.67



SCALES

HORIZONTAL: 1" = 10'
VERTICAL: 1" = 4'

PROPOSED STREET & SIDEWALK IMPROVEMENTS FOR

TOWN OF ELON

ELON, NORTH CAROLINA
BOONE STATION TOWNSHIP, ALAMANCE COUNTY, NC

alley, williams, carmen & king, inc.
ENGINEERS, ARCHITECTS & SURVEYORS
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Firm's Engineering License No. F-0203

NORTH CAROLINA PROFESSIONAL SEAL 12634 ENGINEER MARK D. REID

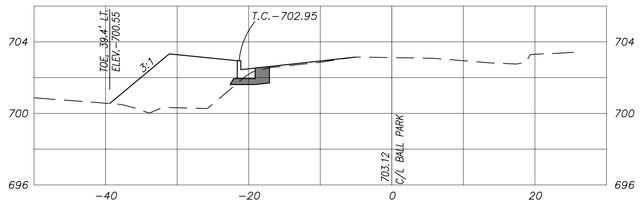
DocuSigned by: Mark D. Reid 4/22/2015

REVISED : 4/17/15 - RELEASED FOR CONSTRUCTION

DATE: 1/16/14	JOB NO. 12190
DRAWN BY: WDF	DWG NAME: 12190BASE.DWG
CHECKED BY: MDR	S. WILLIAMSON AVENUE CROSS SECTIONS
	SHEET NO. 9 of 17

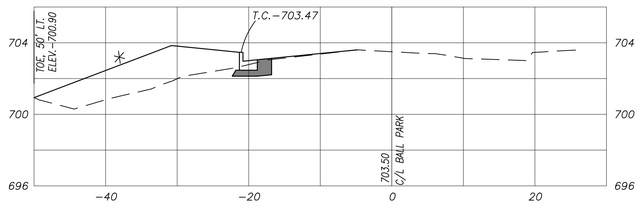
NOTE: CROWN OF ROAD IS OFFSET C/L SURVEY LINE. CROWN IS APPROXIMATELY 5'-6' LEFT OF C/L SURVEY.

1+00



*EXTEND FILL SLOPE AS DIRECTED BY ENGINEER TO PROVIDE POSITIVE DRAINAGE FROM TOE OF SLOPE FROM S. WILLIAMSON AVE. TO STA. 1+00

0+75



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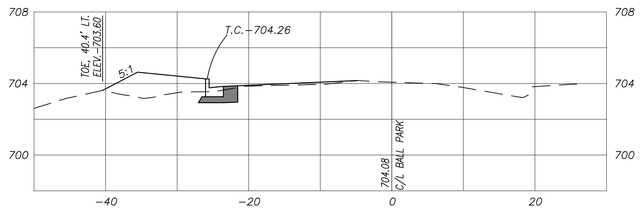

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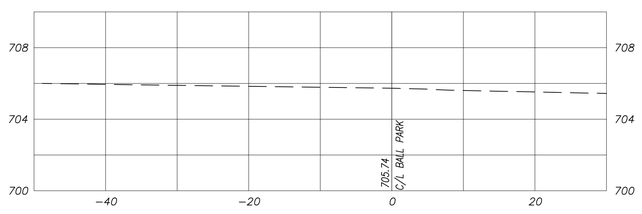
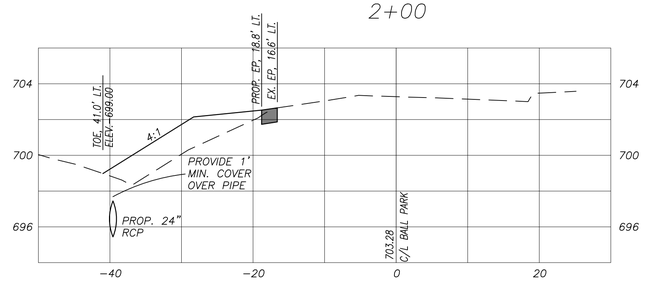
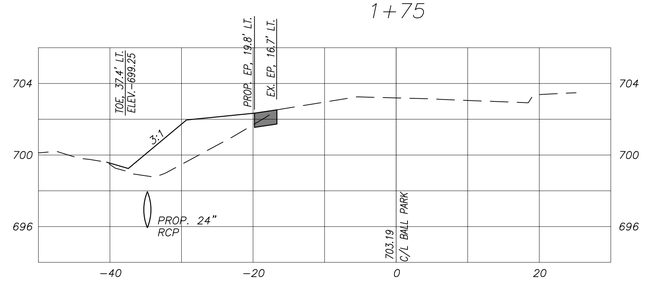


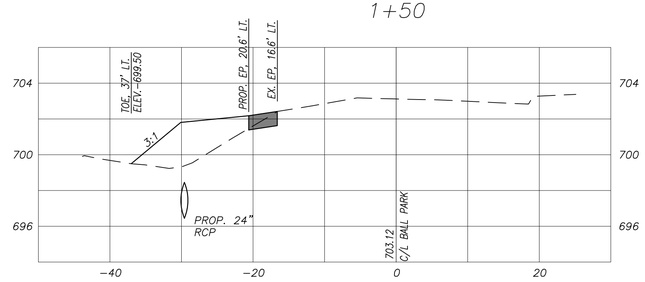
2+00



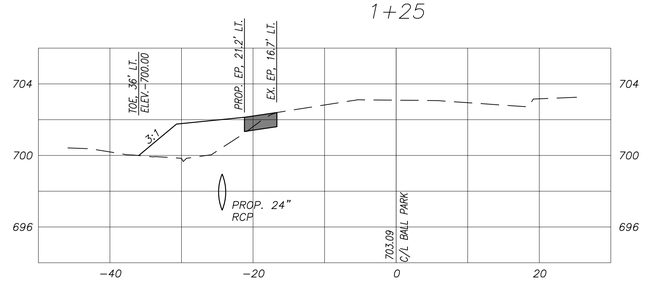
1+75



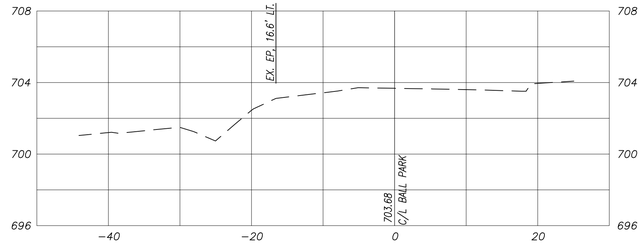
1+50



1+25



3+00



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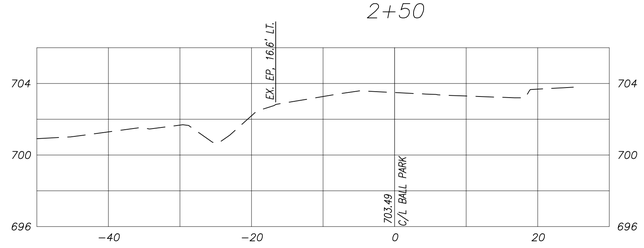
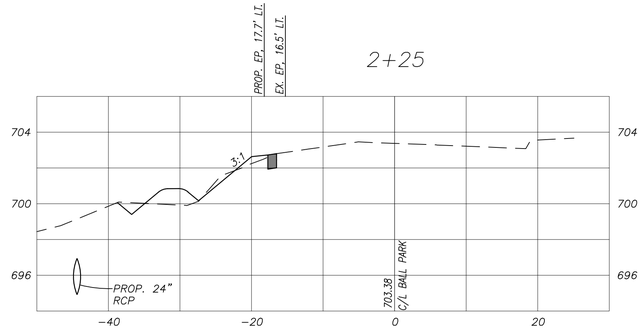


2+25



SCALES

HORIZONTAL: 1" = 10'
VERTICAL: 1" = 4'

NORTH CAROLINA PROFESSIONAL SEAL 12634 ENGINEER MARK D. REICH

Digitally signed by: Mark D. Reich
DN: cn=Mark D. Reich, o=alley, williams, carmen & king, inc., ou=Engineering, email=mreich@awcknet.com, c=US
Date: 2015.04.22 08:37:04 -04'00'
4/22/2015

REVISED : 4/17/15 - RELEASED FOR CONSTRUCTION

PROPOSED STREET & SIDEWALK IMPROVEMENTS FOR

TOWN OF ELON

ELON, NORTH CAROLINA
BOONE STATION TOWNSHIP, ALAMANCE COUNTY, NC

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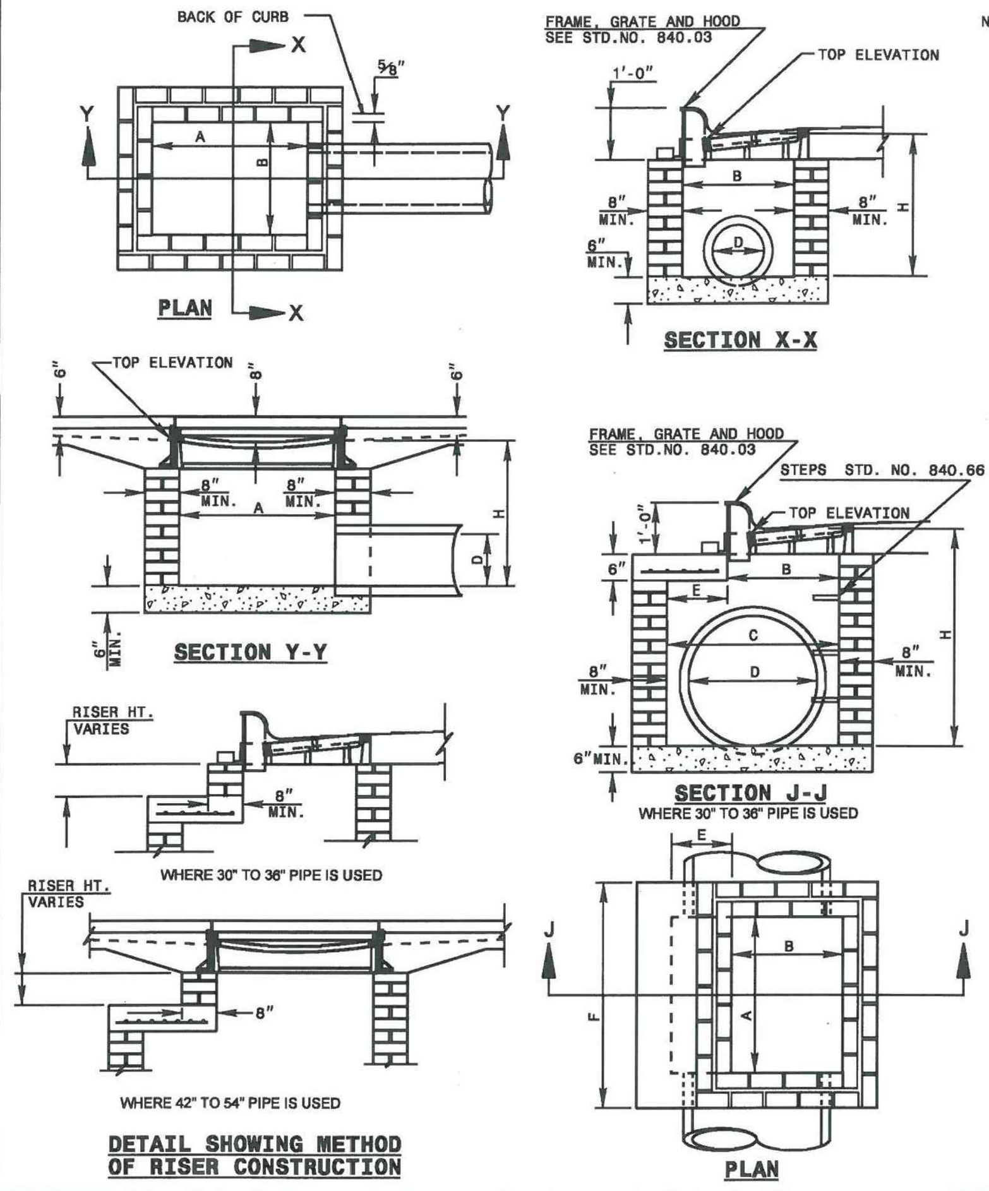
ENGINEERS, ARCHITECTS & SURVEYORS
740 chapel hill road p.o. box 1179
burlington, n.c. 27215 336/226-5534
Firm's Engineering License No. F-0203

DATE: 1/16/14	BALL PARK AVENUE CROSS SECTIONS	JOB NO. 12190
DRAWN BY: WDF		DWG NAME: 12190BASE.DWG
CHECKED BY: MDR		SHEET NO. 10 OF 17

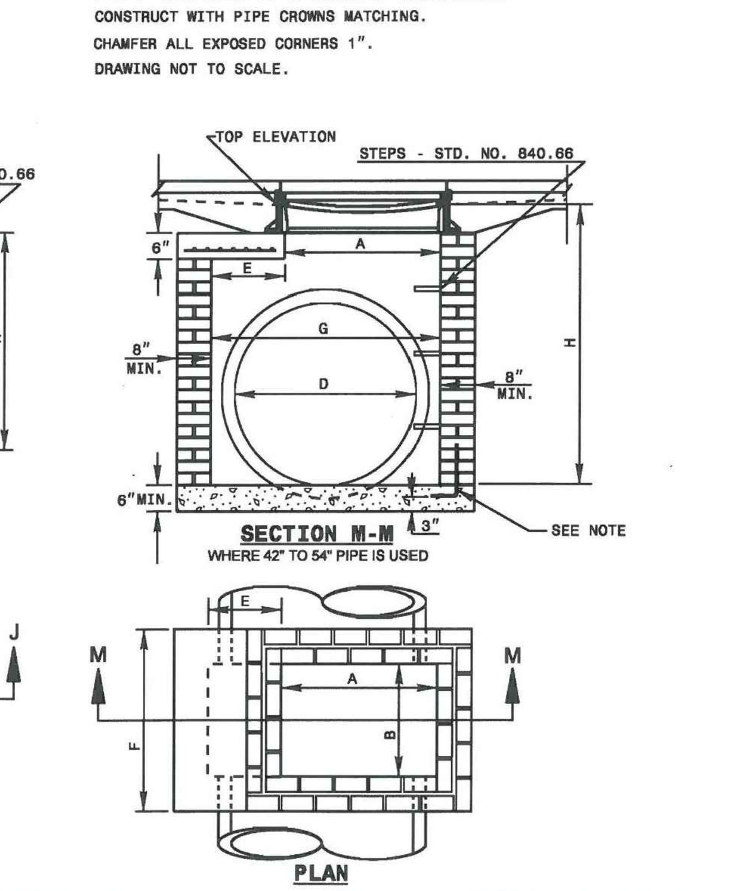
ENGLISH STANDARD DRAWING FOR BRICK CATCH BASIN
12" THRU 54" PIPE

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-12



NOTES: MORTAR JOINTS ½" +/- ⅛" THICK.
USE CLASS "B" CONCRETE THROUGHOUT.
USE FORMS FOR CONSTRUCTION OF THE BOTTOM SLAB.
DEDUCT FOR PIPE(S) FROM TOTAL CU. YDS. OF BRICK MASONRY.
USE #4 BAR DOWELS AT 12" CENTERS.
PROVIDE ALL CATCH BASINS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.
USE TYPE "E", "F" AND "G" GRATES UNLESS OTHERWISE INDICATED.
USE BRICK OR CONCRETE BLOCK WHICH COMPLIES WITH THE REQUIREMENTS OF SECTION 840 OF THE STANDARD SPECIFICATIONS.
IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.
FOR 8'-0" IN HEIGHT OR LESS, USE 8" WALL. OVER 8'-0" IN HEIGHT, USE 12" WALL TO 6'-0" FROM TOP OF WALL AND 8" WALL FOR THE REMAINING 6'-0". QUANTITES TO BE ADJUSTED ACCORDINGLY.
CONSTRUCT WITH PIPE CROWNS MATCHING.
CHAMFER ALL EXPOSED CORNERS 1".
DRAWING NOT TO SCALE.

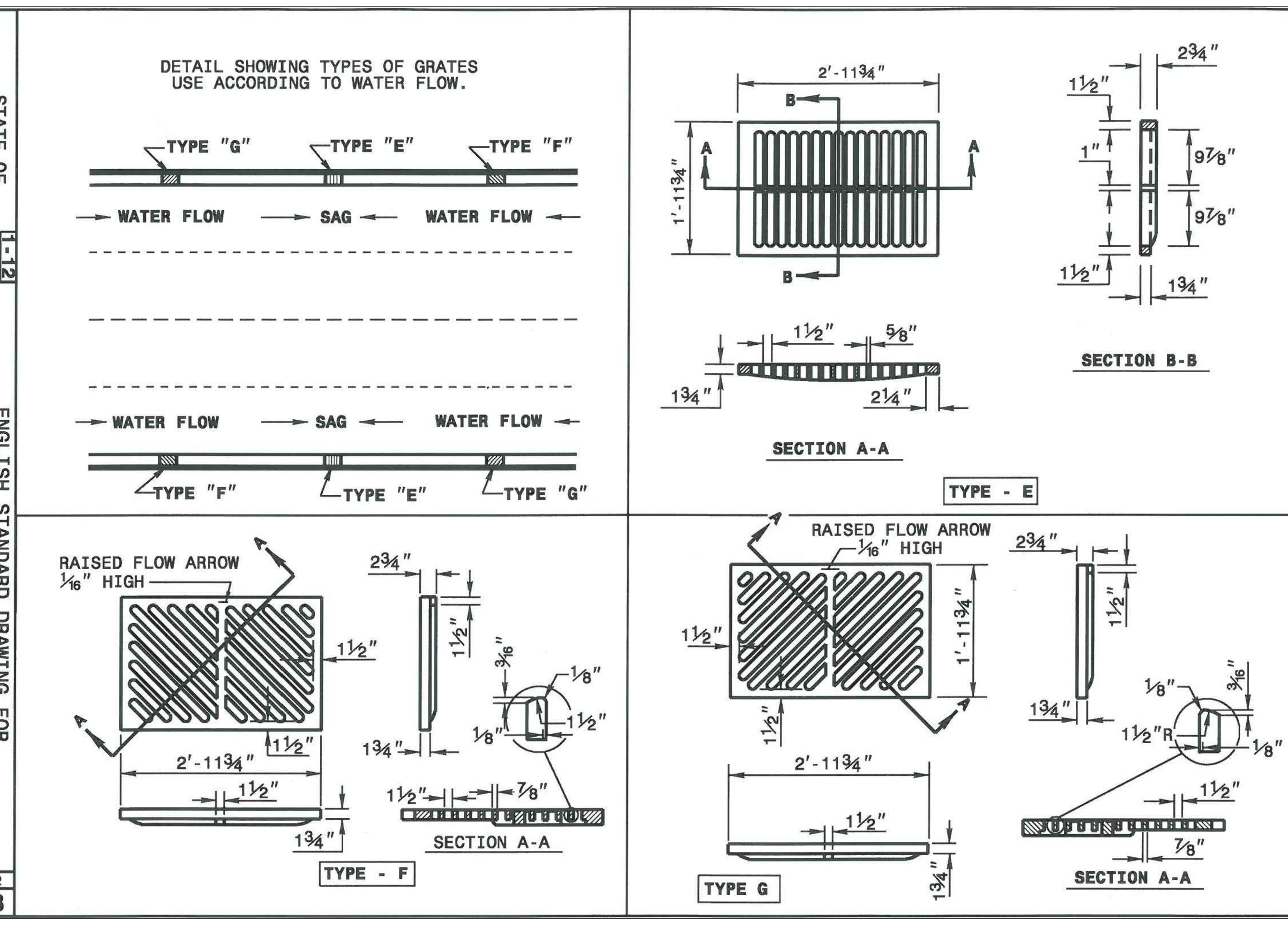


SHEET 1 OF 2
840.01

ENGLISH STANDARD DRAWING FOR FRAME, GRATES, AND HOOD
FOR USE ON STANDARD CATCH BASIN

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-12

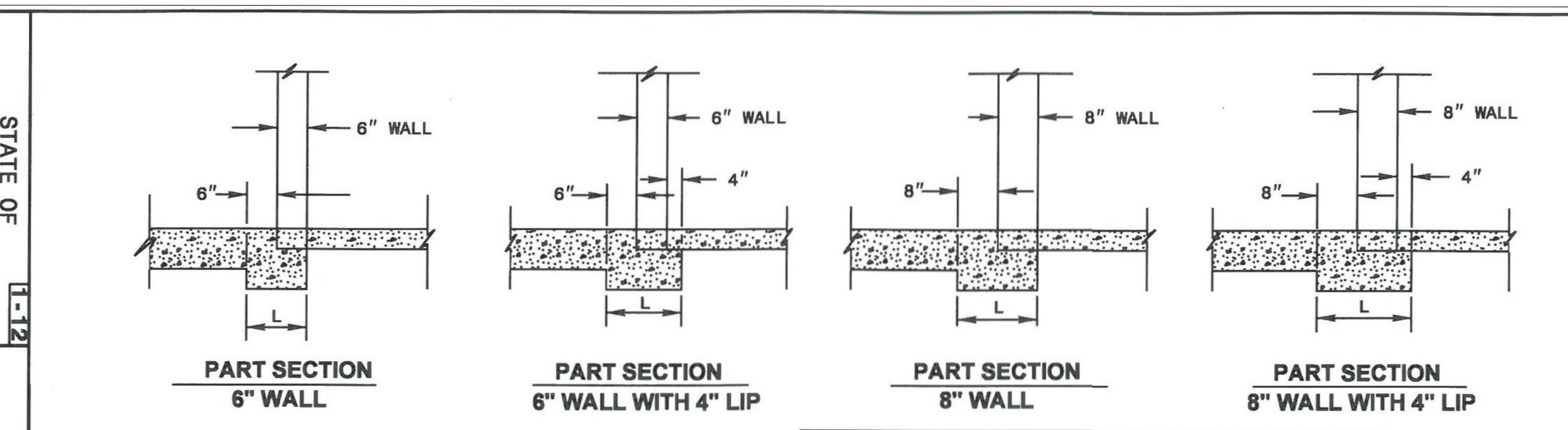


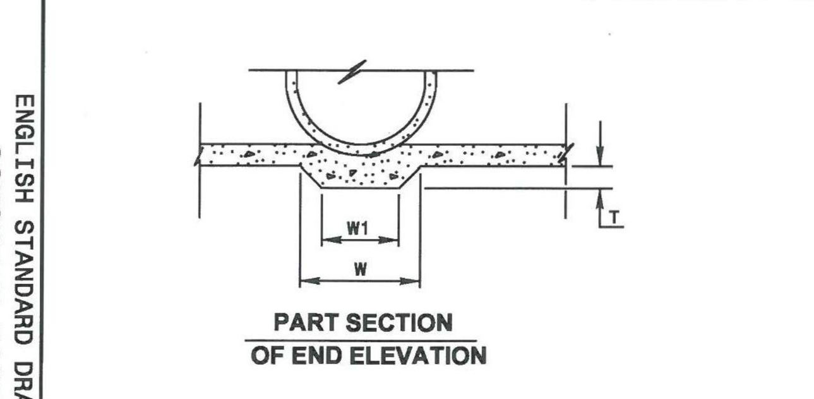
SHEET 2 OF 2
840.03

ENGLISH STANDARD DRAWING FOR CONCRETE BASE PAD FOR DRAINAGE STRUCTURES

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-12





TABLES OF QUANTITIES FOR PIPE SET IN PAD

PIPE D	"W" DIM	"W1" DIM	"T" DIM	C.Y. QUANTITIES WHEN L IS 12"	16"	20"
12"	1'-1⅞"	0'-7⅞"	0'-2"	0.005	0.007	0.008
15"	1'-3⅝"	0'-9⅛"	0'-2"	0.006	0.008	0.010
18"	1'-5¼"	0'-10⅜"	0'-2"	0.007	0.010	0.012
24"	1'-8¾"	1'-0⅛"	0'-3"	0.011	0.014	0.018
30"	2'-0¼"	1'-2¾"	0'-3½"	0.014	0.018	0.023
36"	2'-3¾"	1'-5⅜"	0'-4"	0.017	0.023	0.025
42"	2'-7⅛"	1'-7"	0'-5¼"	0.025	0.030	0.038
48"	2'-10⅝"	1'-8¾"	0'-5¾"	0.028	0.038	0.047
54"	3'-2⅛"	1'-10½"	0'-6¼"	0.035	0.047	0.058
60"	3'-5⅝"	2'-0¼"	0'-6¾"	0.042	0.056	0.071
66"	3'-9"	2'-2¼"	0'-7¼"	0.050	0.067	0.084
72"	4'-0½"	2'-3¾"	0'-7¾"	0.059	0.078	0.098

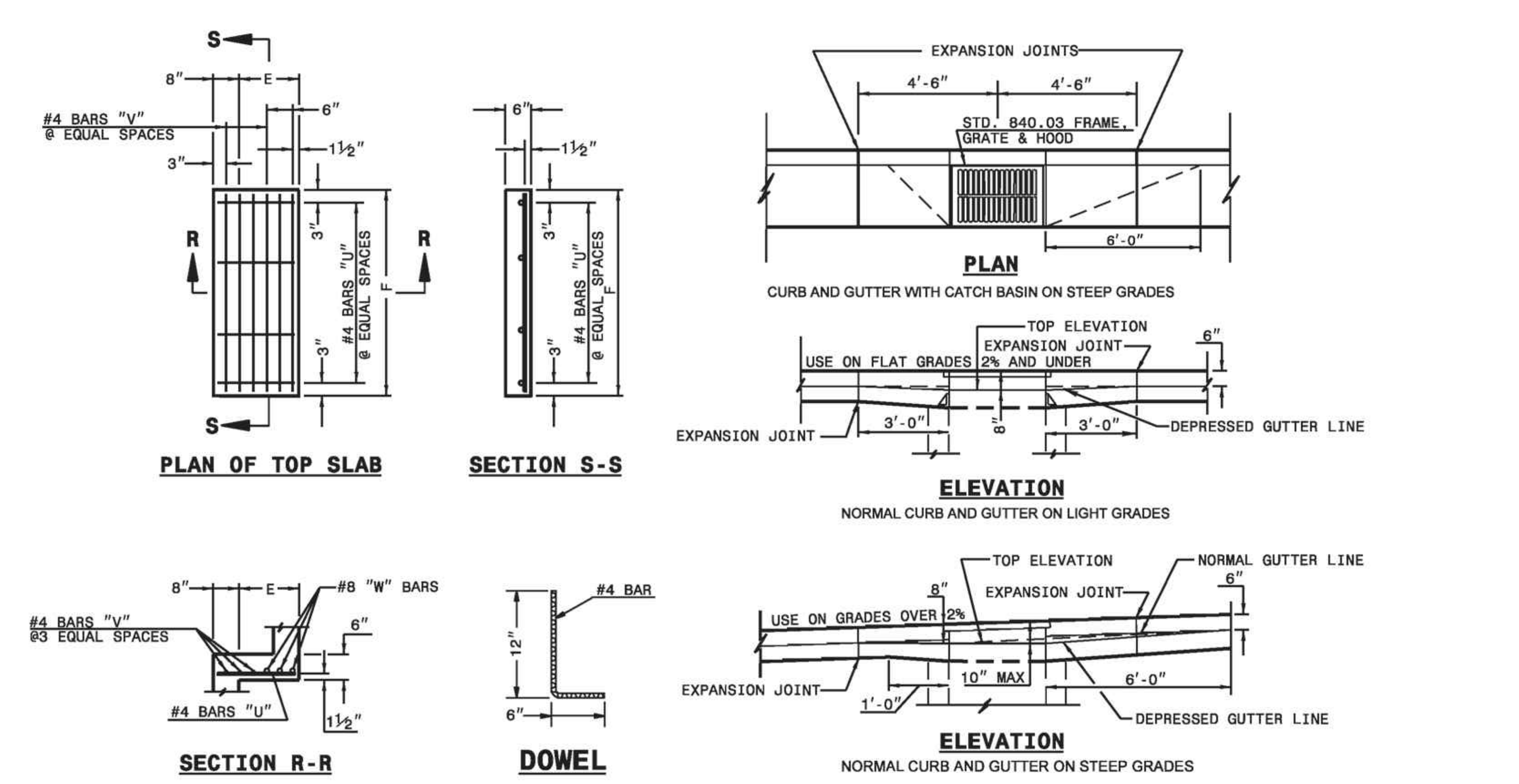
GENERAL NOTES:
USE THIS STANDARD WITH ALL DRAINAGE STRUCTURES USING REINFORCED CONCRETE PIPE SET IN BASE SLAB.

SHEET 1 OF 1
840.00

ENGLISH STANDARD DRAWING FOR BRICK CATCH BASIN
12" THRU 54" PIPE

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-12



MINIMUM DIMENSIONS AND QUANTITIES FOR BRICK CATCH BASIN (BASED ON MIN. HEIGHT, H, WITH NO RISER)*

PIPE D	SPAN A	WIDTH B	WIDTH C	SPAN G	MIN. HEIGHT H	TOP SLAB E	TOP SLAB F	BARS-U NO.	BARS-U LENGTH	BARS-V NO.	BARS-V LENGTH	BARS-W NO.	BARS-W LENGTH	TOTAL LBS.	TOP SLAB	BOTTOM SLAB	TOTAL CONC.	BRICK MSNR. IN WALLS	TOTAL BRICK AND CONCRETE	C.M.	R.C.
12"	3'-0"	2'-2"	--	--	2'-9"	--	--	--	--	--	--	--	--	--	--	0.281	0.281	0.883	1.164	0.020	0.042
15"	3'-0"	2'-2"			3'-0"											0.281	0.281	0.963	1.244	0.031	0.047
18"	3'-0"	2'-2"			3'-3"											0.281	0.281	1.043	1.324	0.044	0.065
24"	3'-0"	2'-2"			3'-9"											0.281	0.281	1.204	1.485	0.078	0.121
30"	3'-0"	2'-2"	3'-4"		4'-3"	1'-2"	4'-4"	4	1'-6"	3	4'-1"	3	4'-1"	45	0.147	0.374	0.521	1.606	2.217	0.122	0.184
36"	3'-0"	2'-2"	3'-10"		4'-9"	1'-8"	4'-4"	4	2'-0"	4	4'-1"	3	4'-1"	49	0.187	0.415	0.602	1.914	2.516	0.176	0.261
42"	3'-0"	2'-2"		4'-5"	5'-3"	1'-5"	3'-6"	4	1'-9"	3	3'-3"	3	3'-3"	38	0.135	0.373	0.508	2.152	2.660	0.240	0.371
48"	3'-0"	2'-2"		5'-0"	5'-9"	2'-0"	3'-6"	4	2'-6"	4	3'-3"	3	3'-3"	41	0.173	0.410	0.583	2.415	2.998	0.313	0.477
54"	3'-0"	2'-2"		5'-7"	6'-3"	2'-7"	3'-6"	4	3'-0"	6	3'-3"	3	3'-3"	47	0.211	0.448	0.659	2.806	3.465	0.396	0.595

(Column groups: DIMENSIONS OF BOX AND PIPE; TOP SLAB DIMENSIONS; BARS-U; BARS-V; BARS-W; CU.YDS. CONC. IN BOX; BRICK MASONRY; DEDUCTIONS ONE PIPE)

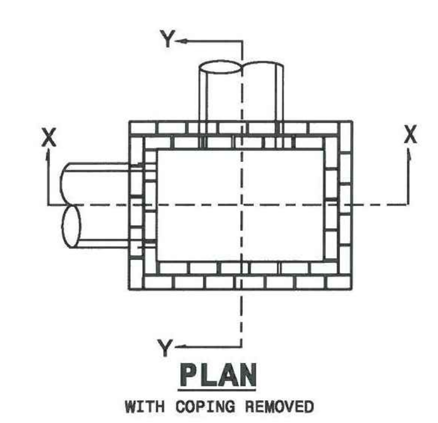
* RISER HAS .321 CUBIC YARDS OF BRICK MASONRY PER FOOT HEIGHT

SHEET 2 OF 2
840.01

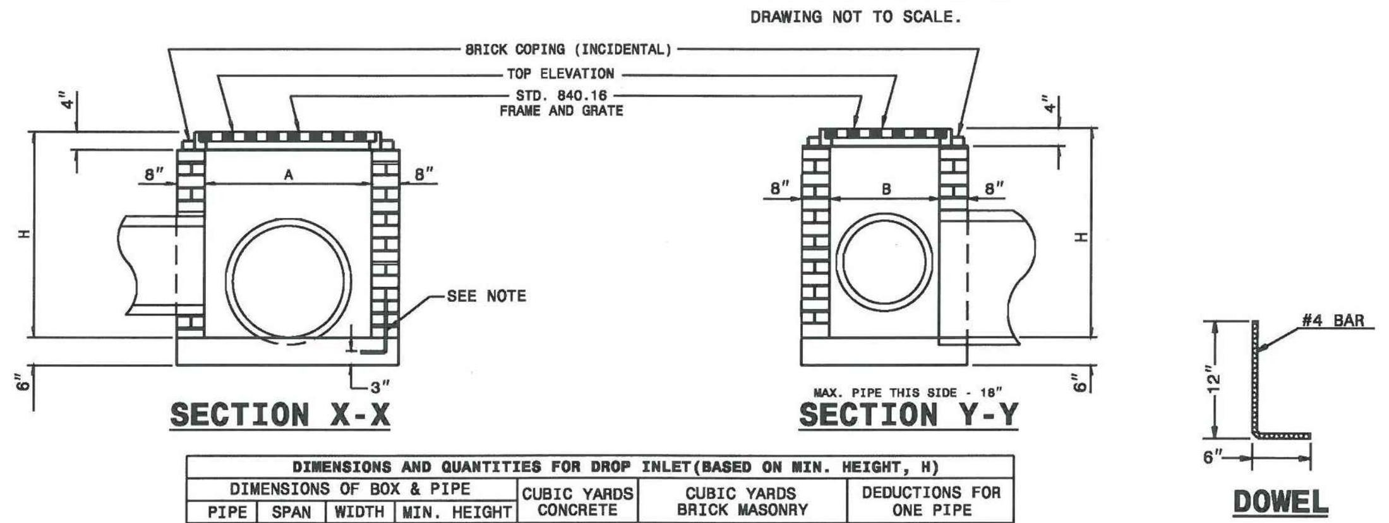
ENGLISH STANDARD DRAWING FOR BRICK DROP INLET
12" THRU 30" PIPE

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-12



GENERAL NOTES:
MORTAR JOINTS ½" +/- ⅛" THICK.
USE CLASS "B" CONCRETE THROUGHOUT.
USE FORMS FOR CONSTRUCTION OF THE BOTTOM SLAB.
USE #4 BAR DOWELS AT 12" CENTERS.
DEDUCT FOR PIPE(S) FROM TOTAL CU. YDS. OF BRICK MASONRY.
PROVIDE ALL CATCH BASINS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.
USE BRICK OR CONCRETE BLOCK WHICH COMPLIES WITH THE REQUIREMENTS OF SECTION 840 OF THE STANDARD SPECIFICATIONS.
IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.
FOR 8'-0" IN HEIGHT OR LESS, USE 8" WALL. OVER 8'-0" IN HEIGHT, USE 12" WALL TO 6'-0" FROM TOP OF WALL AND 8" WALL FOR THE REMAINING 6'-0". QUANTITES TO BE ADJUSTED ACCORDINGLY.
CONSTRUCT WITH PIPE CROWNS MATCHING.
SEE STANDARD DRAWING 840.25 FOR ATTACHMENT OF FRAMES AND GRATES.
DO NOT USE BRICK MASONRY DROP INLET IN LOCATIONS SUBJECT TO TRAFFIC.
CHAMFER ALL EXPOSED CORNERS 1".
DRAWING NOT TO SCALE.



DIMENSIONS AND QUANTITIES FOR DROP INLET (BASED ON MIN. HEIGHT, H)

PIPE D	SPAN A	WIDTH B	MIN. HEIGHT H	CUBIC YARDS CONCRETE BOTTOM SLAB	CUBIC YARDS BRICK MASONRY WALL PER FOOT HT.	TOTAL BRICK MASONRY FOR MIN. HEIGHT, H	DEDUCTIONS FOR ONE PIPE C.S.	R.C.
12"	3'-0"	2'-0"	2'-0"	0.268	0.313	0.522	0.020	0.032
15"	/	/	2'-3"	0.268	0.313	0.600	0.031	0.047
18"	/	/	2'-6"	0.268	0.313	0.678	0.044	0.065
24"	/	/	3'-0"	0.268	0.313	0.835	0.078	0.113
30"	3'-0"	2'-0"	3'-6"	0.268	0.313	0.991	0.122	0.170

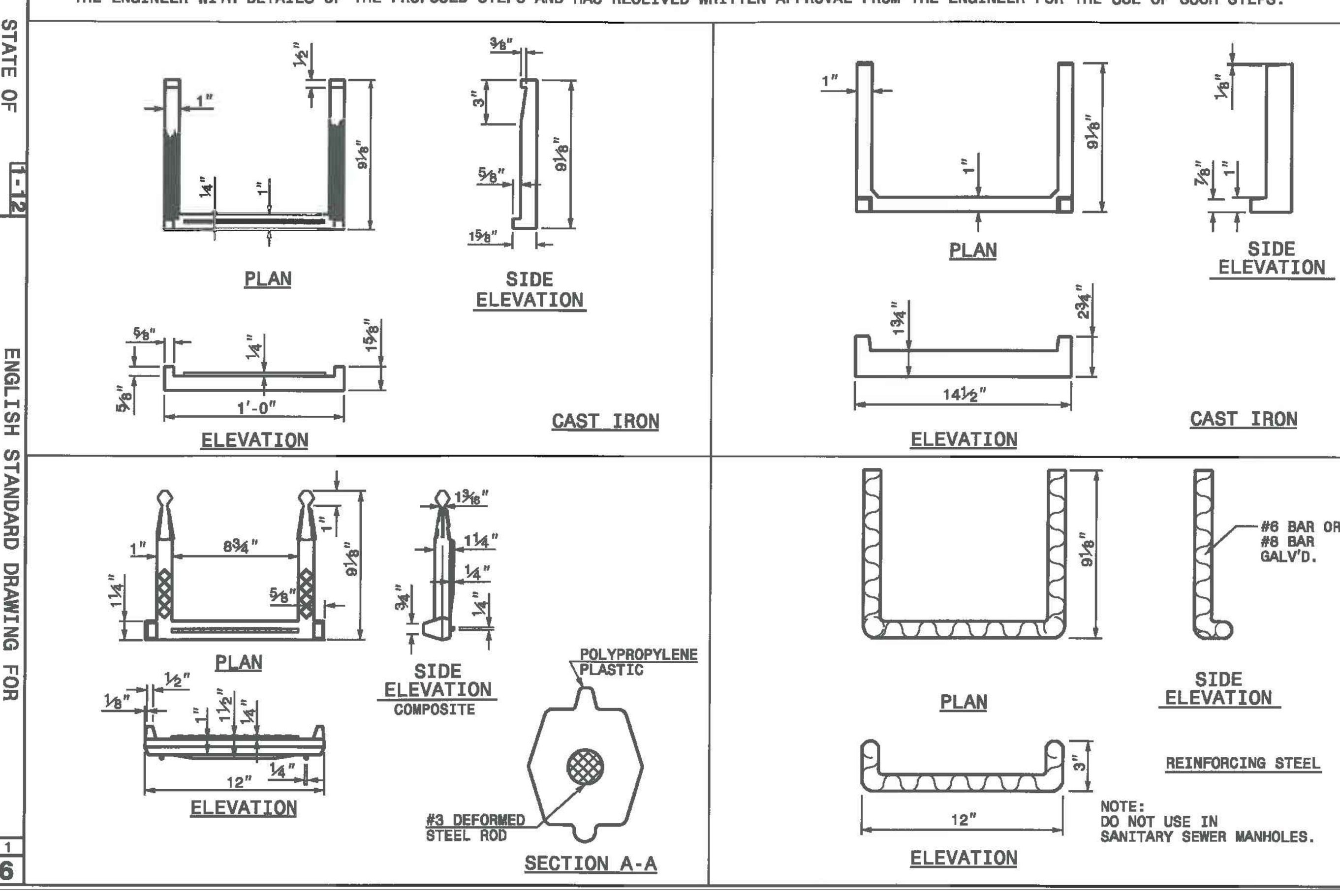
SHEET 1 OF 1
840.15

ENGLISH STANDARD DRAWING FOR DRAINAGE STRUCTURE STEPS

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-12

NOTES:
INSTALL ALL STEPS PROTRUDING 4" FROM INSIDE FACE OF STRUCTURE WALL.
STEPS DIFFERING IN DIMENSIONS, CONFIGURATION, OR MATERIALS FROM THOSE SHOWN MAY ALSO BE USED PROVIDED THE CONTRACTOR HAS FURNISHED THE ENGINEER WITH DETAILS OF THE PROPOSED STEPS AND HAS RECEIVED WRITTEN APPROVAL FROM THE ENGINEER FOR THE USE OF SUCH STEPS.



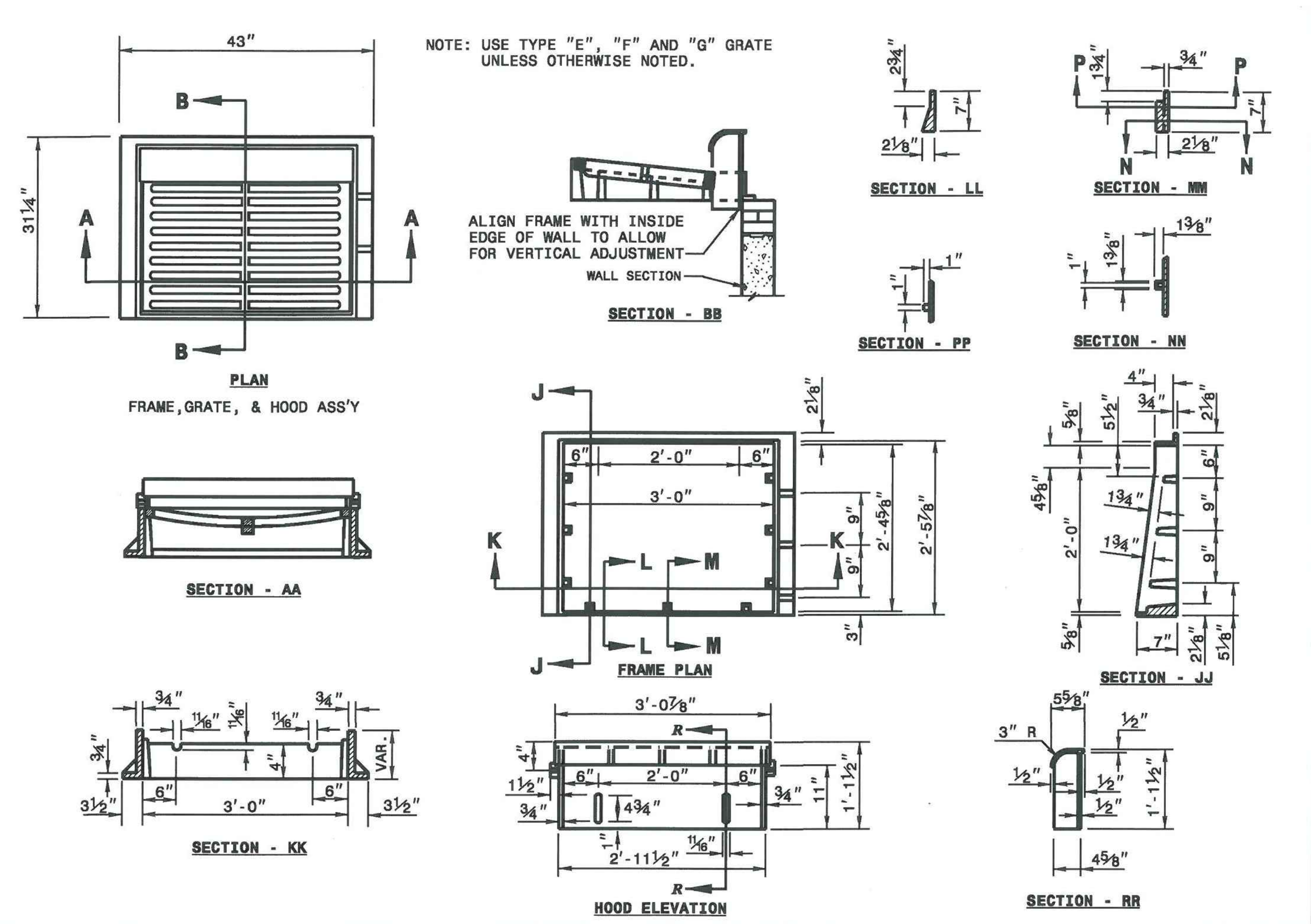
SHEET 1 OF 1
840.66

ENGLISH STANDARD DRAWING FOR FRAME, GRATES, AND HOOD
FOR USE ON STANDARD CATCH BASIN

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-12

NOTE: USE TYPE "E", "F" AND "G" GRATE UNLESS OTHERWISE NOTED.

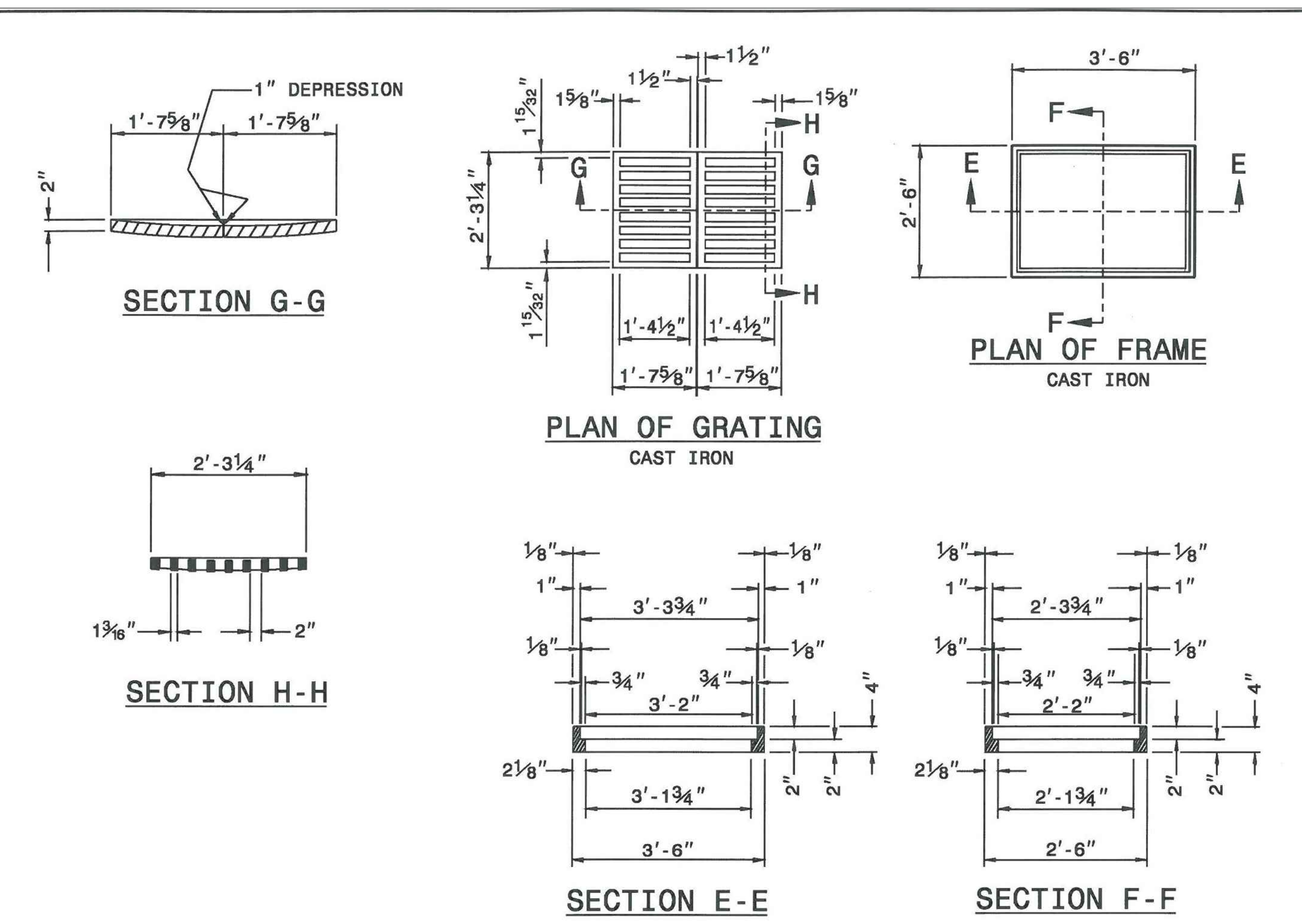


SHEET 1 OF 2
840.03

ENGLISH STANDARD DRAWING FOR DROP INLET FRAME AND GRATES
FOR USE WITH STD. DWG.S 840.14 AND 840.15

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-12



SHEET 1 OF 1
840.16

REVISED : 4/17/15 - RELEASED FOR CONSTRUCTION

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12634 MARK D. REICH
DocuSigned by: Mark D. Reich
586375049ADB4D7...
4/22/2015

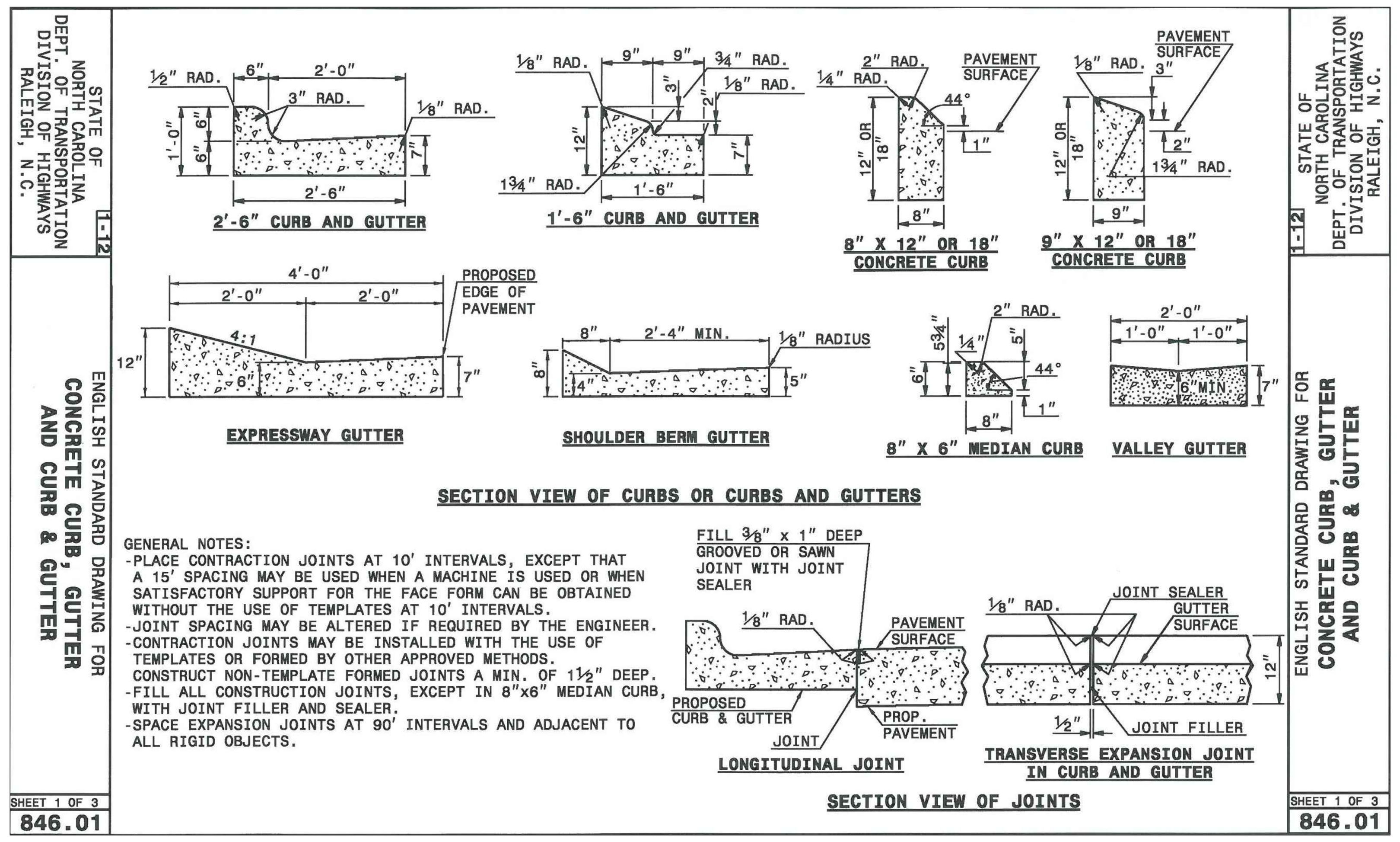
PROPOSED STREET & SIDEWALK IMPROVEMENTS FOR

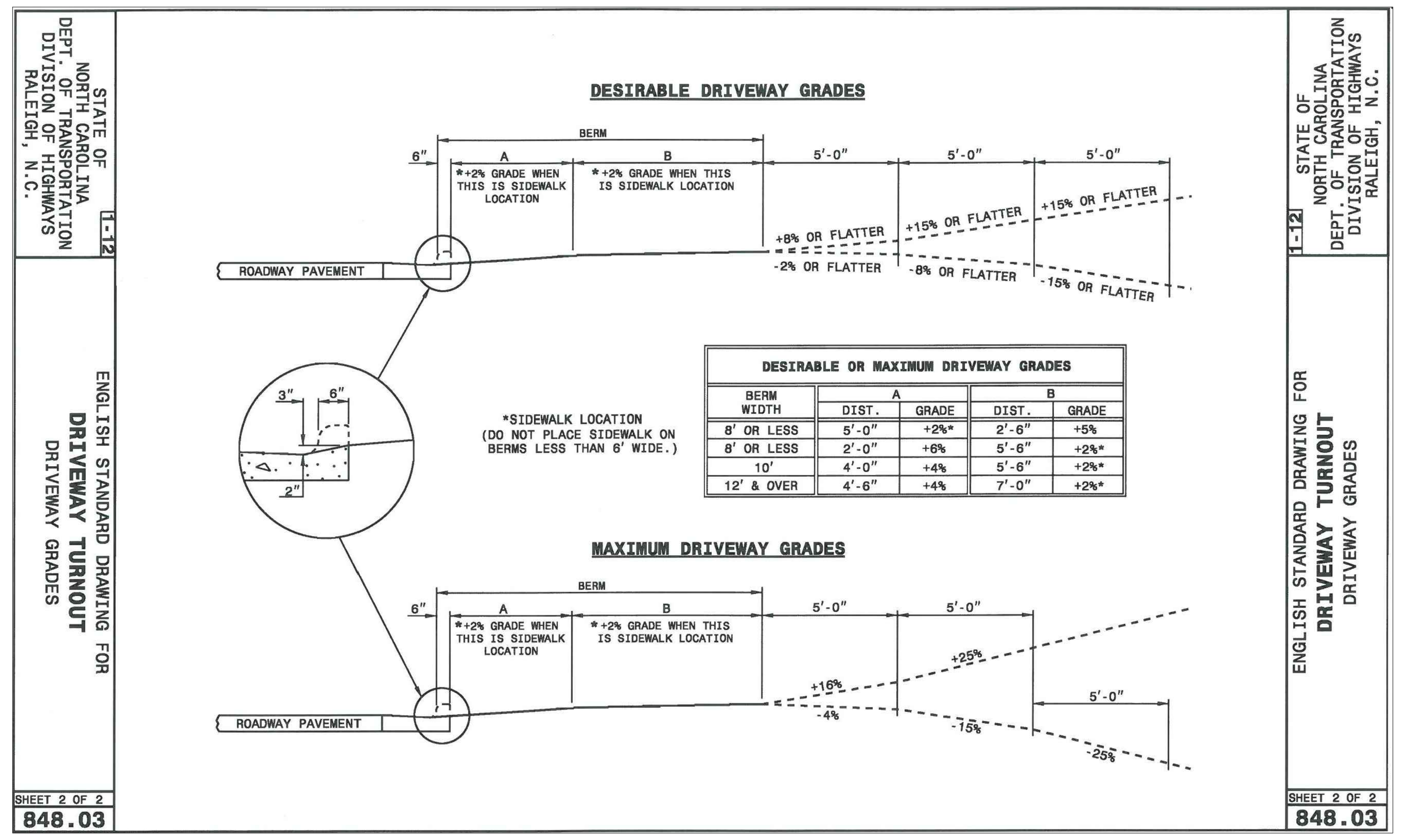
TOWN OF ELON

HAW RIVER, NORTH CAROLINA
HAW RIVER TOWNSHIP, ALAMANCE COUNTY, NC

alley, williams, carmen & king, inc.
ENGINEERS, ARCHITECTS & SURVEYORS
740 chapel hill road | p.o. box 1179
burlington, n.c. 27215 | 336/226-5534
Firm's Engineering License No. F-0203

DATE: 1/16/14	CONSTRUCTION DETAILS	JOB NO. 12190
DRAWN BY: WDF		DWG NAME: 12190DETAILS.DWG
CHECKED BY: MDR		SHEET NO. 11 of 17





DESIRABLE OR MAXIMUM DRIVEWAY GRADES

BERM WIDTH	A DIST.	A GRADE	B DIST.	B GRADE
8' OR LESS	5'-0"	+2%*	2'-6"	+5%
8' OR LESS	2'-0"	+6%	5'-6"	+2%*
10'	4'-0"	+4%	5'-6"	+2%*
12' & OVER	4'-6"	+4%	7'-0"	+2%*

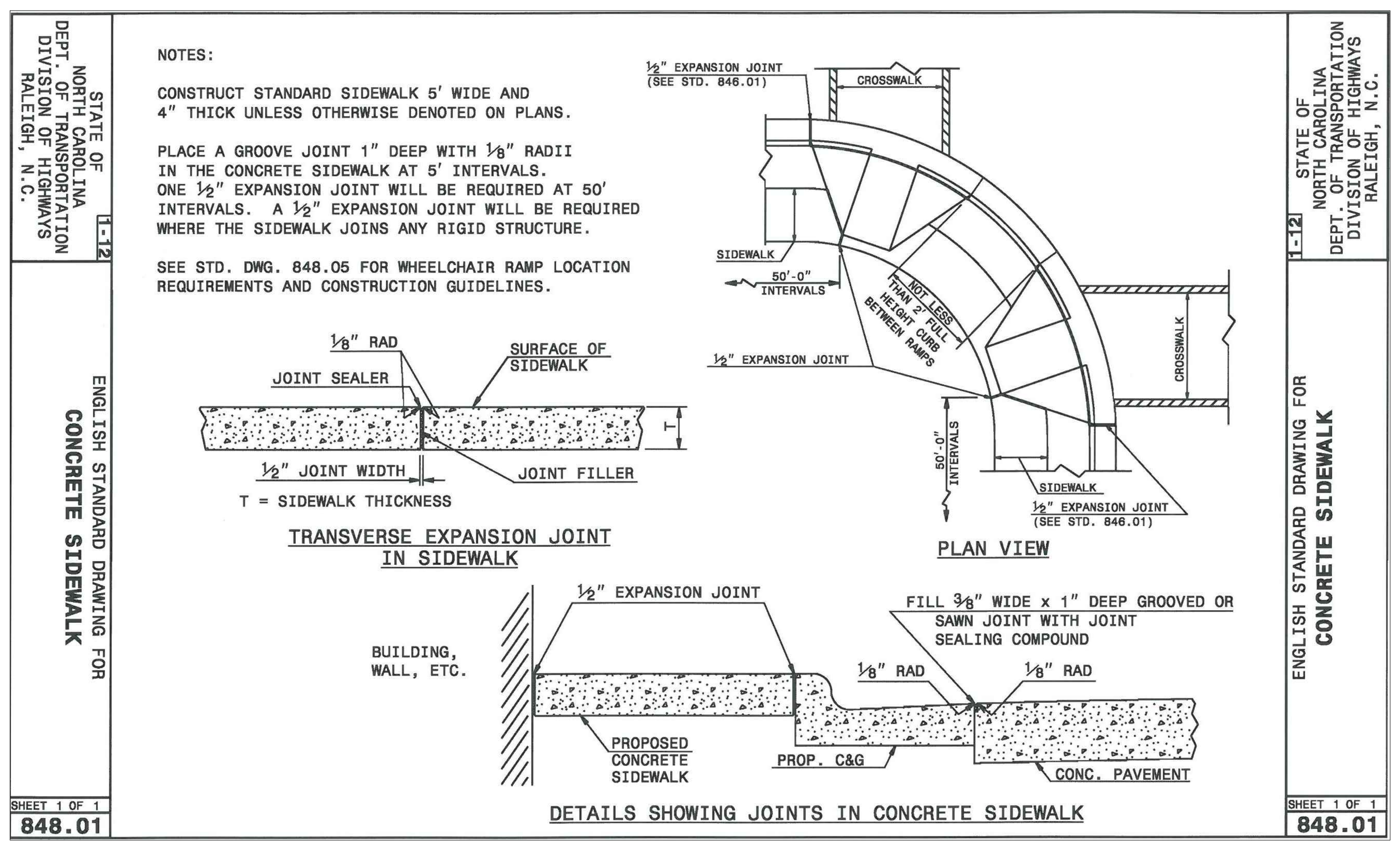
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-12

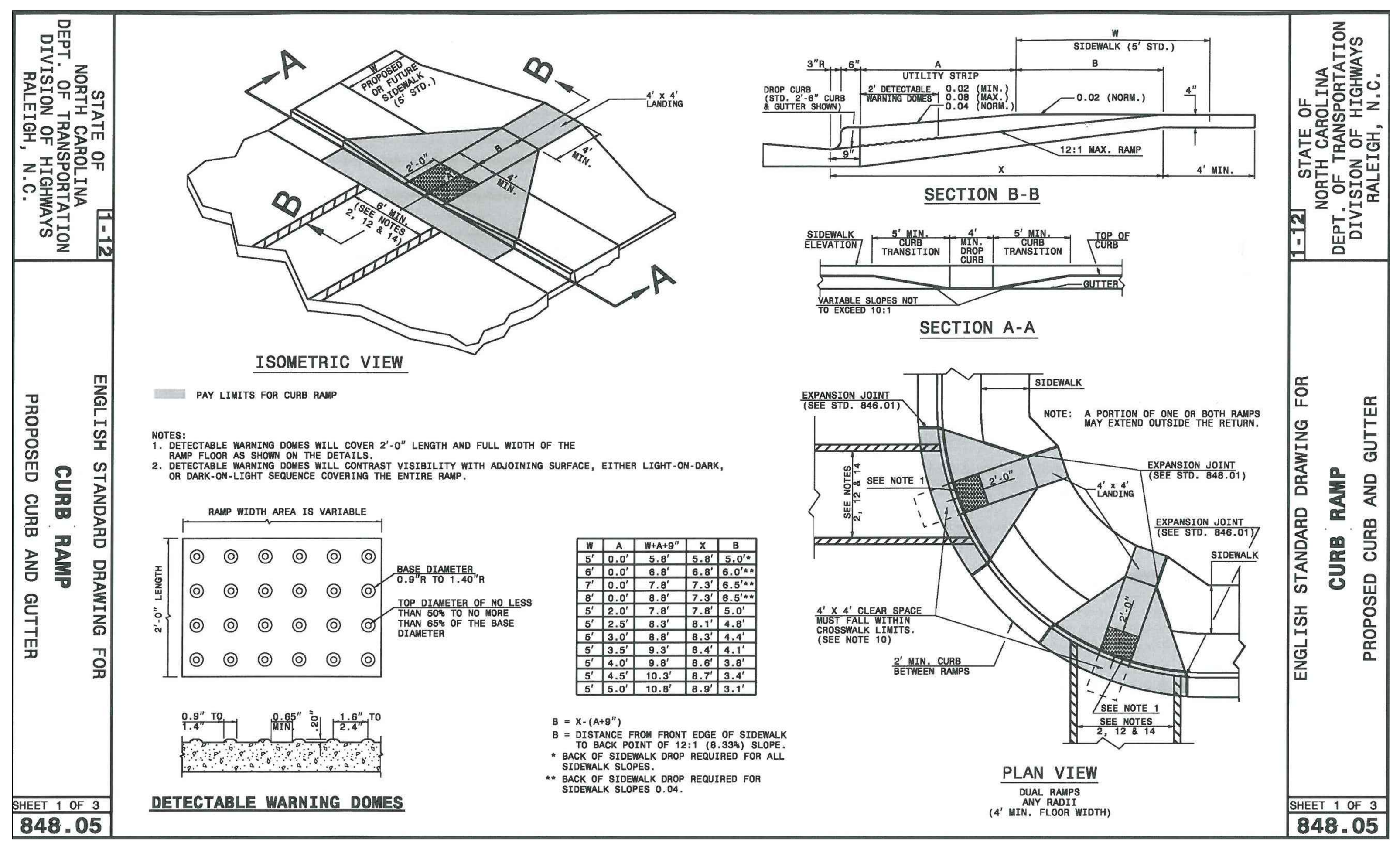
ENGLISH STANDARD DRAWING FOR **CURB RAMPS** NOTES

NOTES:

1. CONSTRUCT THE RAMP SURFACE TO BE STABLE, FIRM, AND SLIP RESISTANT. CONSTRUCT THE CURB RAMP TYPE AS SHOWN IN THE PAVEMENT MARKING PLANS OR AS DIRECTED BY THE ENGINEER.
2. LOCATE CURB RAMPS AND PLACE PEDESTRIAN CROSSWALK MARKINGS AS SHOWN IN THE PAVEMENT MARKING PLANS. WHEN FIELD ADJUSTMENTS REQUIRE MOVING CURB RAMPS OR MARKINGS AS SHOWN, CONTACT THE SIGNING AND DELINEATION UNIT OR LOCATE AS DIRECTED BY THE ENGINEER.
3. COORDINATE THE CURB RAMP AND THE PEDESTRIAN CROSSWALK MARKINGS SO A 4'x4' CLEAR SPACE AT THE BASE OF THE CURB RAMP WILL FALL WITHIN THE PEDESTRIAN CROSSWALK LINES.
4. SET BACK DISTANCE FROM INSIDE CROSSWALK MARKING TO NEAREST EDGE OF TRAVEL LANE IS 4' MINIMUM.
5. REFER TO THE PAVEMENT MARKING PLANS FOR STOP BAR LOCATIONS AT SIGNALIZED INTERSECTIONS. IF A PAVEMENT MARKING PLAN IS NOT PROVIDED, CONTACT THE SIGNAL DESIGN SECTION FOR THE STOP BAR LOCATIONS OR LOCATE AS DIRECTED BY THE ENGINEER.
6. TERMINATE PARKING A MINIMUM OF 20' BACK OF A PEDESTRIAN CROSSWALK.
7. CONSTRUCT CURB RAMPS A MINIMUM OF 4' WIDE.
8. CONSTRUCT THE RUNNING SLOPE OF THE RAMP 8.33% MAXIMUM.
9. ALLOWABLE CROSS SLOPE ON SIDEWALKS AND CURB RAMPS WILL BE 2% MAXIMUM.
10. CONSTRUCT THE SIDE FLARE SLOPE A MAXIMUM OF 10% MEASURED ALONG THE CURB LINE.
11. CONSTRUCT THE COUNTER SLOPE OF THE GUTTER OR STREET AT THE BASE OF THE CURB RAMP A MAXIMUM OF 5% AND MAINTAIN A SMOOTH TRANSITION.
12. CONSTRUCT LANDINGS FOR SIDEWALK A MINIMUM OF 4'x4' WITH A MAXIMUM SLOPE OF 2% IN ANY DIRECTION. CONSTRUCT LANDINGS FOR MEDIAN ISLANDS A MINIMUM OF 5'x5' WITH A MAXIMUM SLOPE OF 2% IN ANY DIRECTION.
13. TO USE A MEDIAN ISLAND AS A PEDESTRIAN REFUGE AREA, MEDIAN ISLANDS WILL BE A MINIMUM OF 6' WIDE. CONSTRUCT MEDIAN ISLANDS TO PROVIDE PASSAGE OVER OR THROUGHT THE ISLAND.
14. SMALL CHANNELIZATION ISLANDS THAT CAN NOT PROVIDE A 5'X5' LANDING AT THE TOP OF A RAMPS, WILL BE CUT THROUGH LEVEL WITH THE SURFACE STREET.
15. CURB RAMPS WITH RETURNED CURBS MAY BE USED ONLY WHERE PEDESTRIANS WOULD NOT NORMALLY WALK ACROSS THE RAMP. THE ADJACENT SURFACE IS PLANTING OR OTHER NON-WALKING SURFACE OR THE SIDE APPROACH IS SUBSTANTIALLY OBSTRUCTED.
16. PLACE A ½" EXPANSION JOINT WHERE THE CONCRETE CURB RAMP JOINS THE CURB AS SHOWN IN ROADWAY STANDARD DRAWING 848.01
17. PLACE ALL PEDESTRIAN PUSH BUTTON ACTUATORS AND CROSSING SIGNALS AS SHOWN IN THE PLANS OR AS SHOWN IN THE MUTCD.
18. CURB RAMPS THROUGH MEDIAN ISLANDS, SINGLE RAMPS AT DUAL CROSSWALKS OR LIMITED R/W SITUATIONS, WILL BE HANDLED BY SPECIAL DETAILS. CONTACT THE CONTRACT STANDARDS AND DEVELOPMENT UNIT FOR THE DETAILS OR FOR A SPECIAL DESIGN.

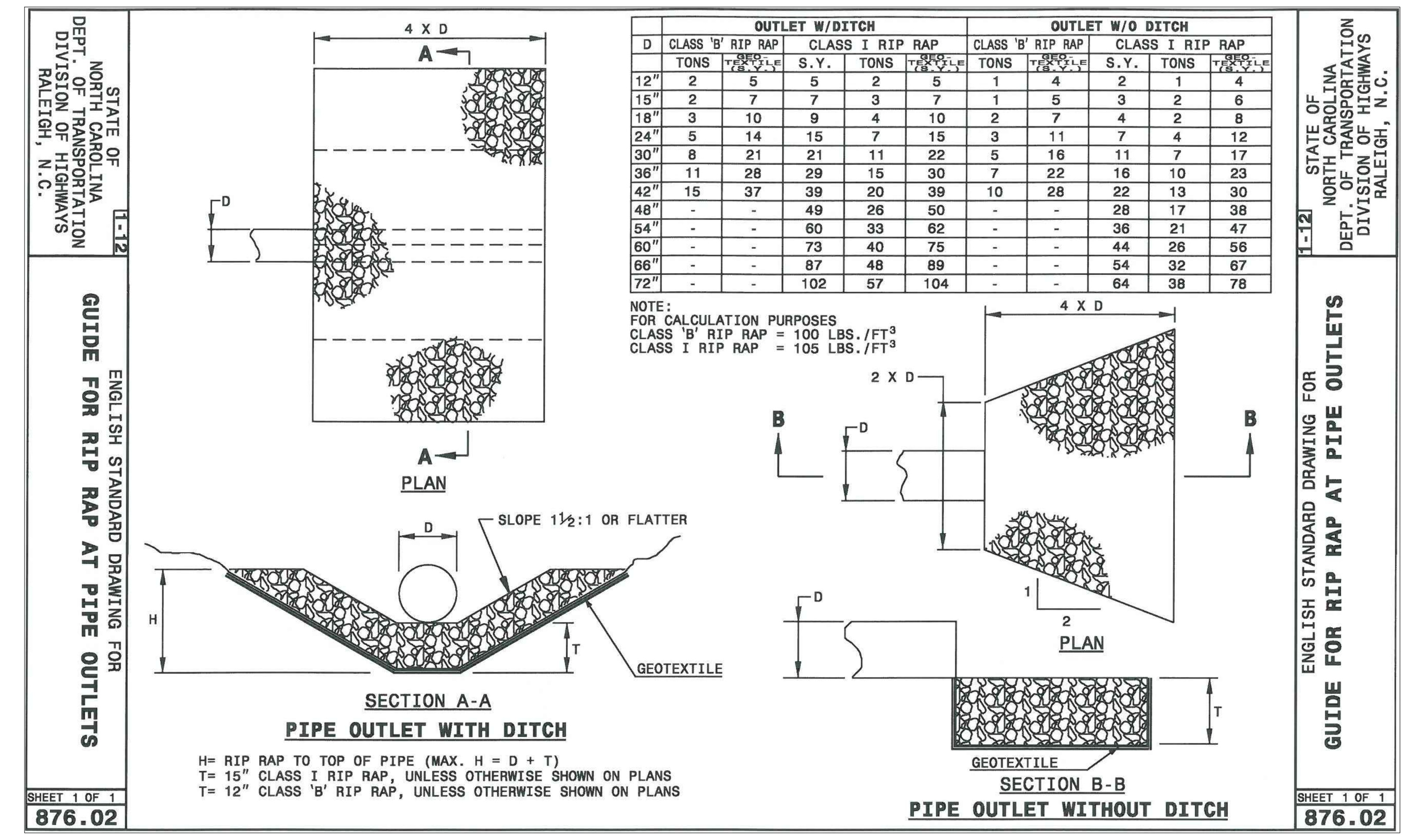
SHEET 3 OF 3 848.05





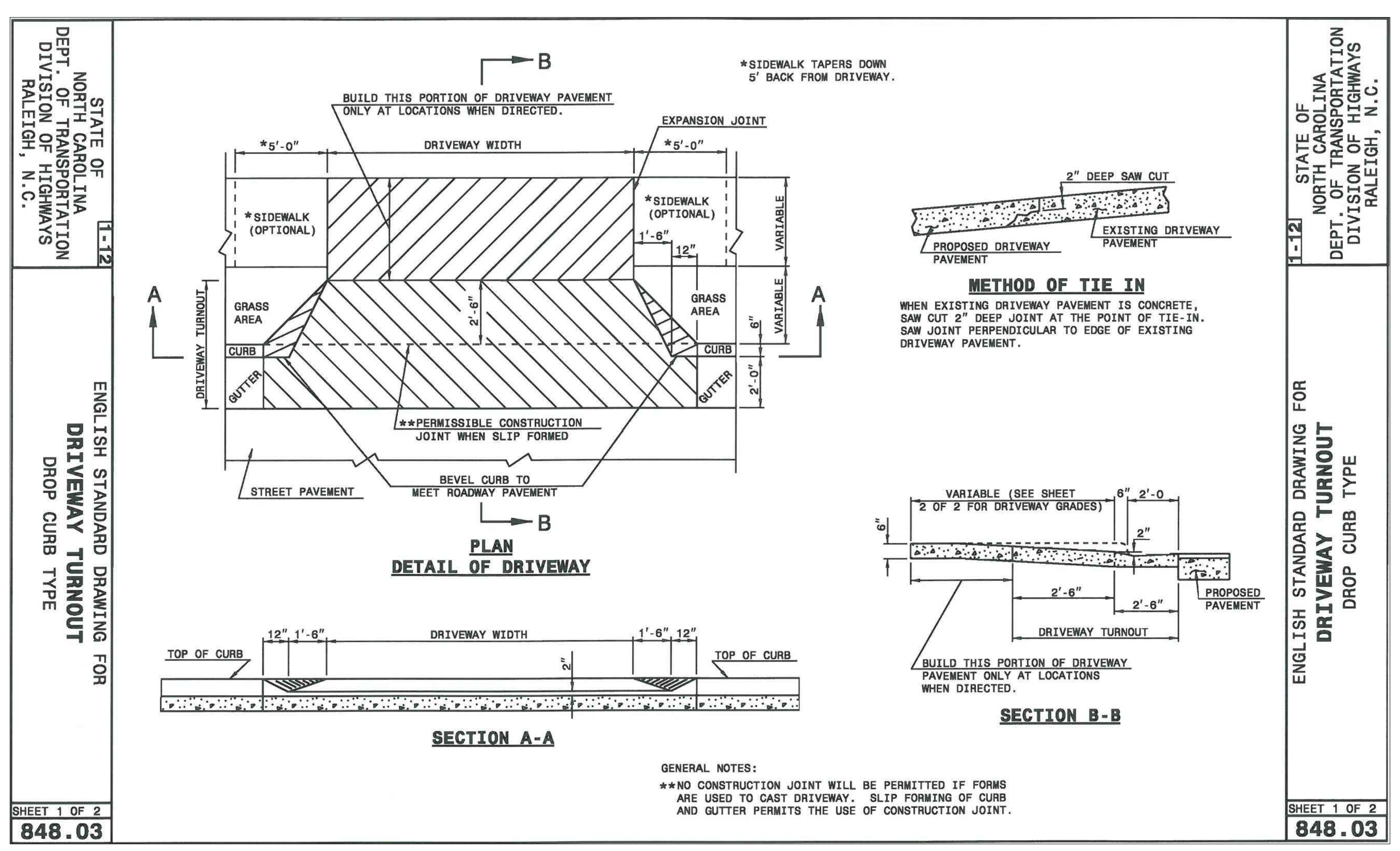
W	A	W+A+9"	X	B
5'	0.0'	5.8'	5.8'	5.0'*
6'	0.0'	6.8'	6.8'	6.0'**
7'	0.0'	7.8'	7.3'	6.5'**
8'	0.0'	8.8'	7.3'	6.5'**
5'	2.0'	7.8'	7.8'	5.0'
5'	2.5'	8.3'	8.1'	4.8'
5'	3.0'	8.8'	8.3'	4.4'
5'	3.5'	9.3'	8.4'	4.1'
5'	4.0'	9.8'	8.6'	3.8'
5'	4.5'	10.3'	8.7'	3.4'
5'	5.0'	10.8'	8.9'	3.1'

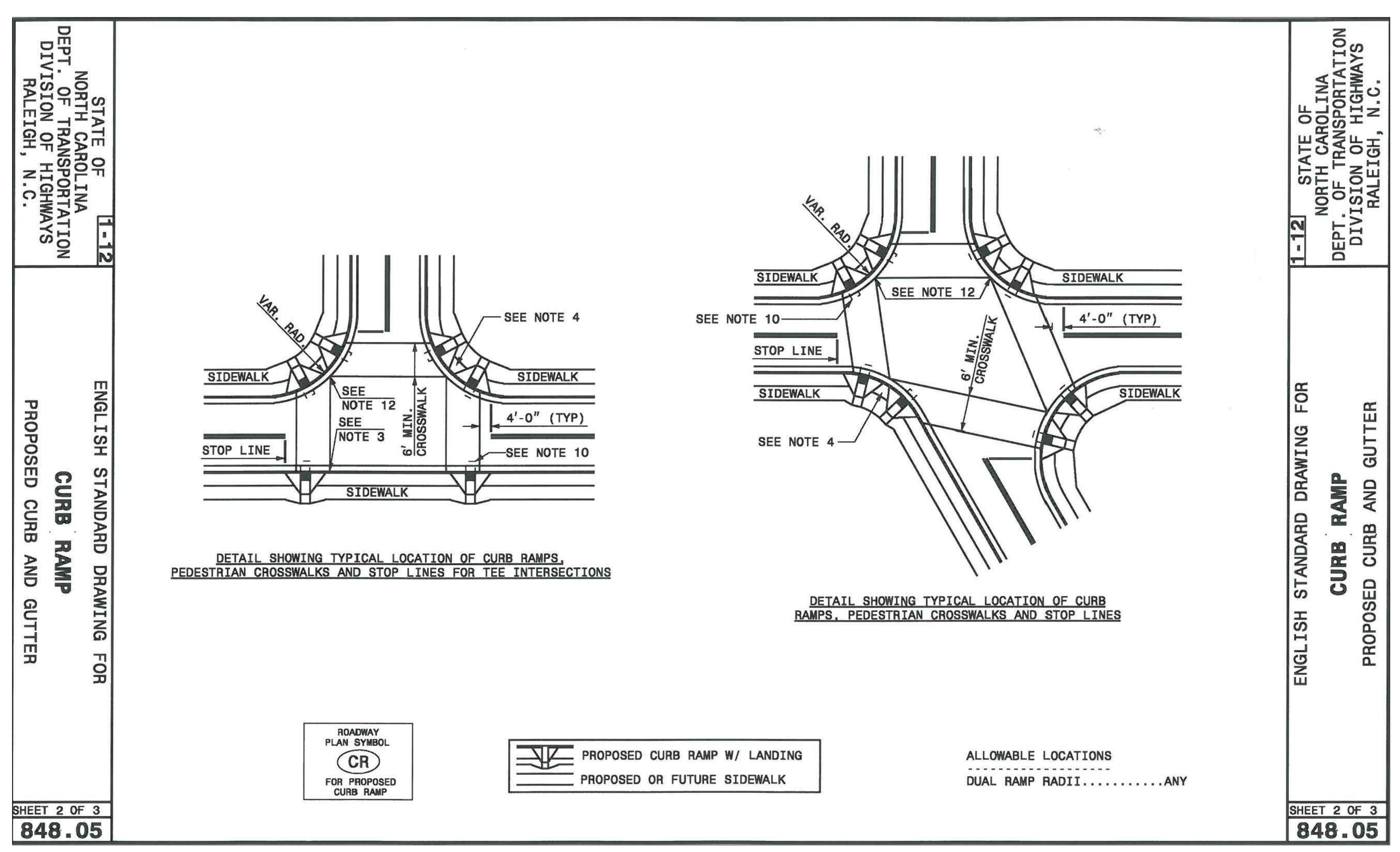
B = X-(A+9")
B = DISTANCE FROM FRONT EDGE OF SIDEWALK TO BACK POINT OF 12:1 (8.33%) SLOPE.
* BACK OF SIDEWALK DROP REQUIRED FOR ALL SIDEWALK SLOPES.
** BACK OF SIDEWALK DROP REQUIRED FOR SIDEWALK SLOPES 0.04.



D	OUTLET W/DITCH: CLASS 'B' RIP RAP TONS	CLASS 'B' RIP RAP GEO-TEXTILE (S.Y.)	CLASS I RIP RAP S.Y.	CLASS I RIP RAP TONS	CLASS I RIP RAP GEO-TEXTILE (S.Y.)	OUTLET W/O DITCH: CLASS 'B' RIP RAP TONS	CLASS 'B' RIP RAP GEO-TEXTILE (S.Y.)	CLASS I RIP RAP S.Y.	CLASS I RIP RAP TONS	CLASS I RIP RAP GEO-TEXTILE (S.Y.)
12"	2	5	5	2	5	1	4	2	1	4
15"	2	7	7	3	7	1	5	3	2	6
18"	3	10	9	4	10	2	7	4	2	8
24"	5	14	15	7	15	3	11	7	4	12
30"	8	21	21	11	22	5	16	11	7	17
36"	11	28	29	15	30	7	22	16	10	23
42"	15	37	39	20	39	10	28	22	13	30
48"	-	-	49	26	50	-	-	28	17	38
54"	-	-	60	33	62	-	-	36	21	47
60"	-	-	73	40	75	-	-	44	26	56
66"	-	-	87	48	89	-	-	54	32	67
72"	-	-	102	57	104	-	-	64	38	78

NOTE:
FOR CALCULATION PURPOSES
CLASS 'B' RIP RAP = 100 LBS./FT^3
CLASS I RIP RAP = 105 LBS./FT^3





PROPOSED STREET & SIDEWALK IMPROVEMENTS FOR

TOWN OF ELON

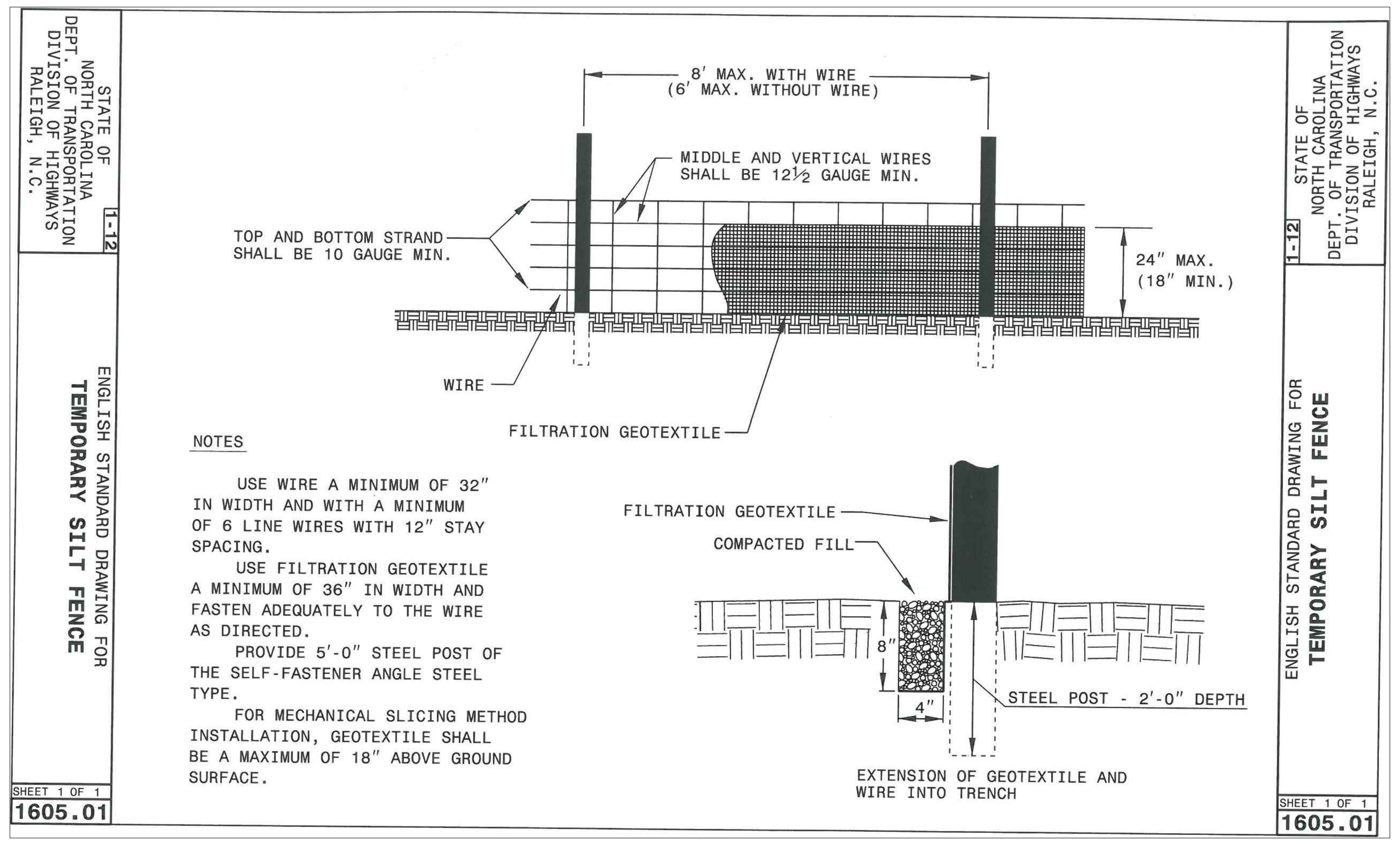
HAW RIVER, NORTH CAROLINA
HAW RIVER TOWNSHIP, ALAMANCE COUNTY, NC

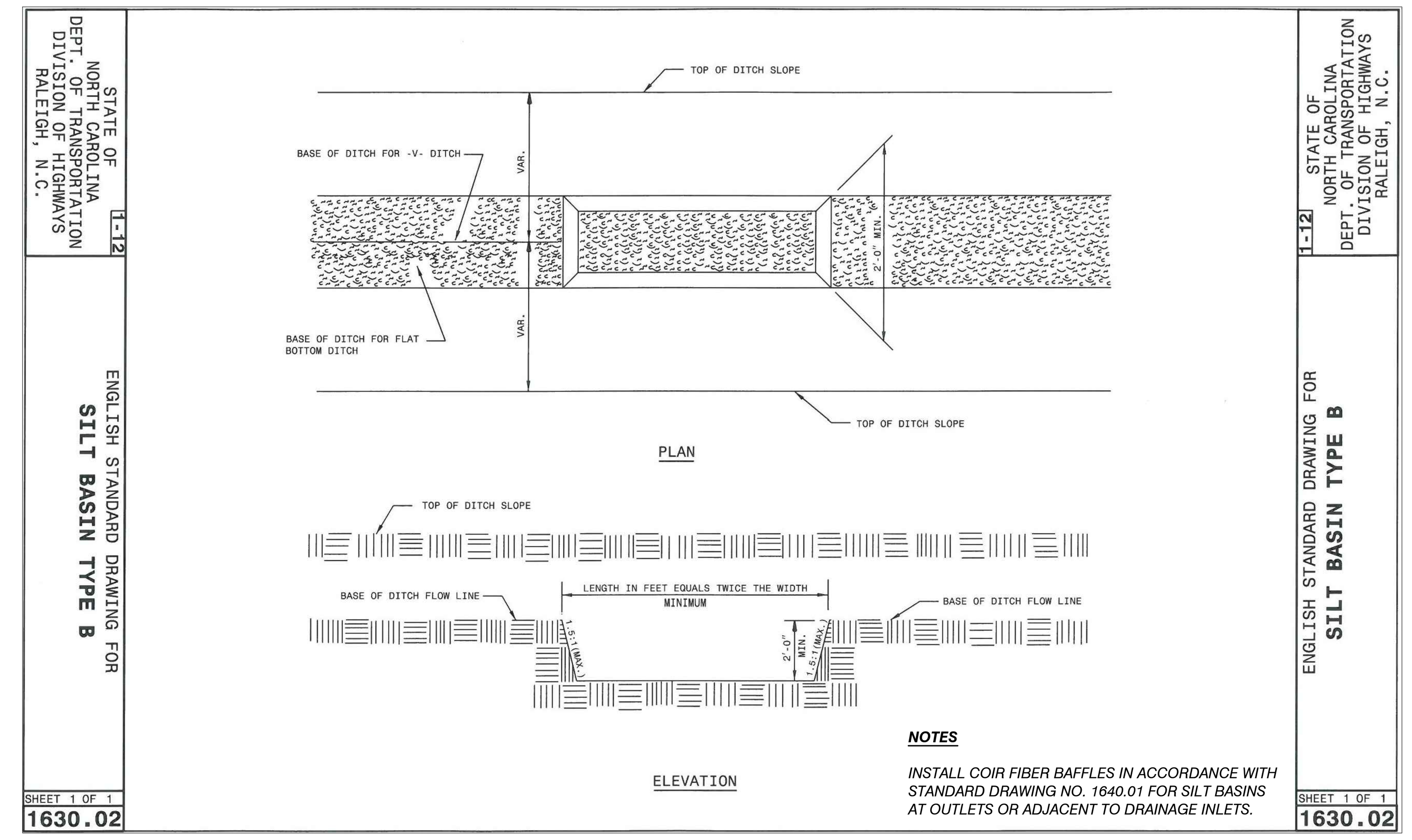
alley, williams, carmen & king, inc.
ENGINEERS, ARCHITECTS & SURVEYORS
740 chapel hill road, burlington, n.c. 27215
p.o. box 1179, 336/226-5534
Firm's Engineering License No. F-0203

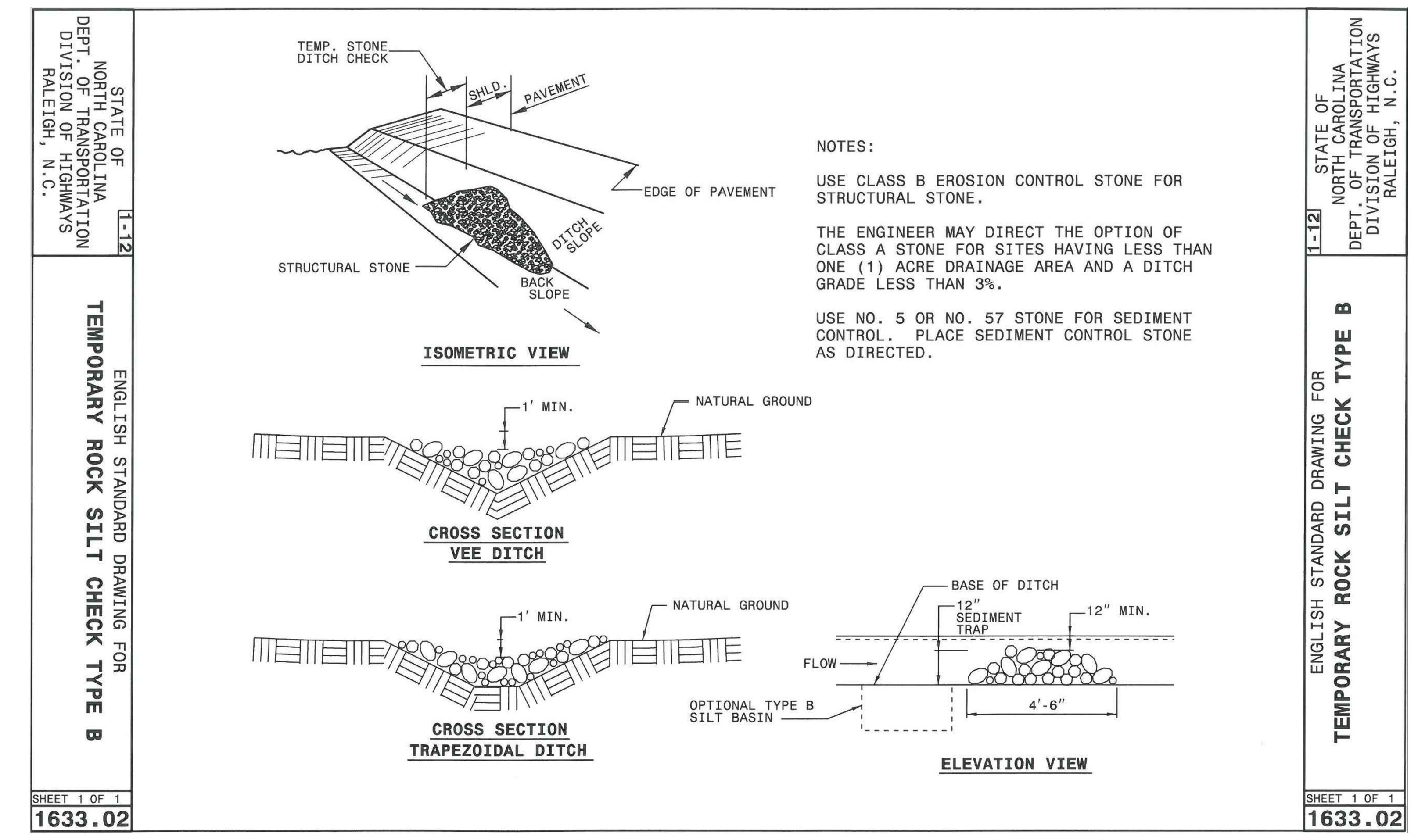
NORTH CAROLINA PROFESSIONAL SEAL 12634 ENGINEER MARK D. REICH
DocuSigned by: Mark D. Reich 4/22/2015

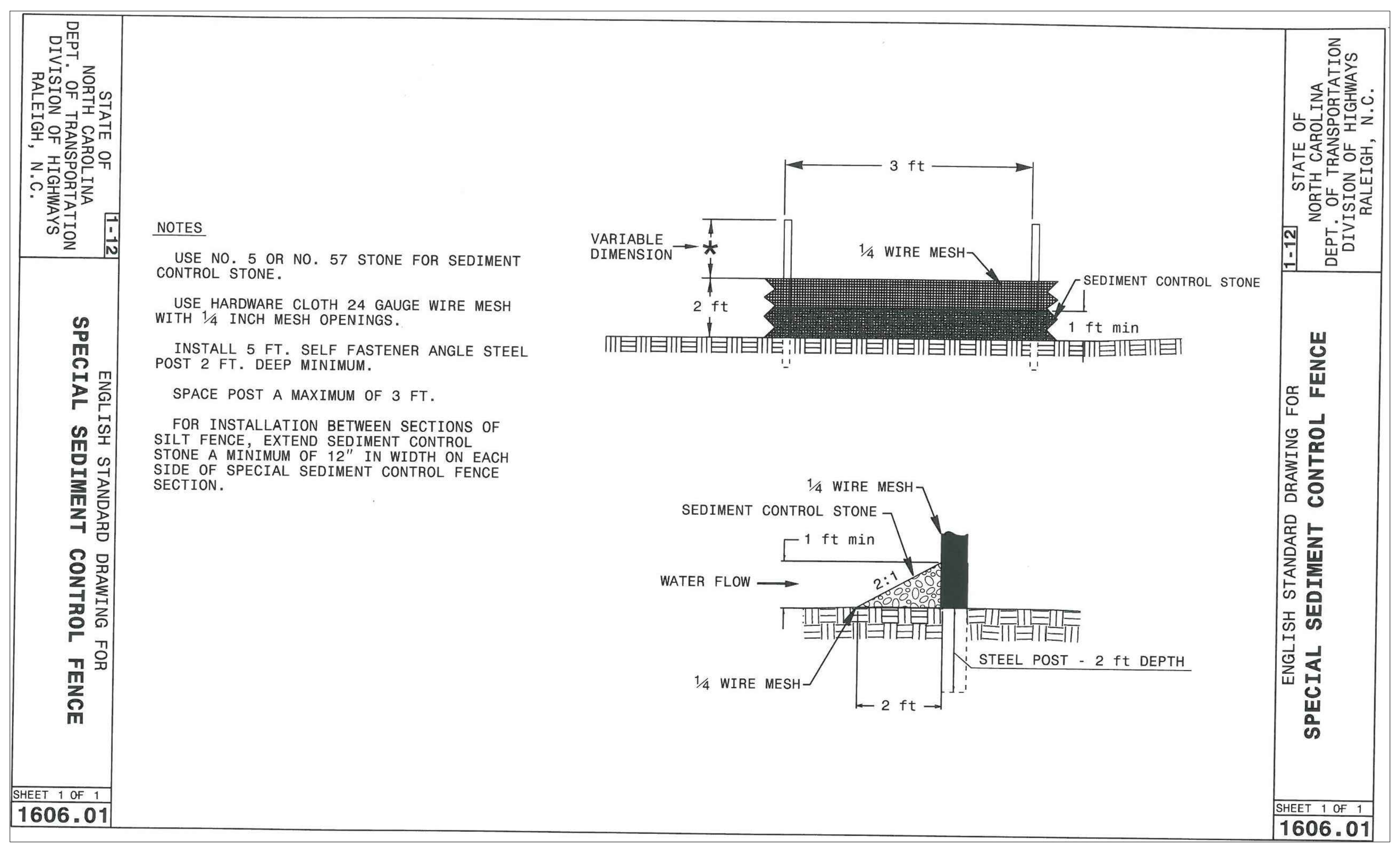
REVISED : 4/17/15 - RELEASED FOR CONSTRUCTION

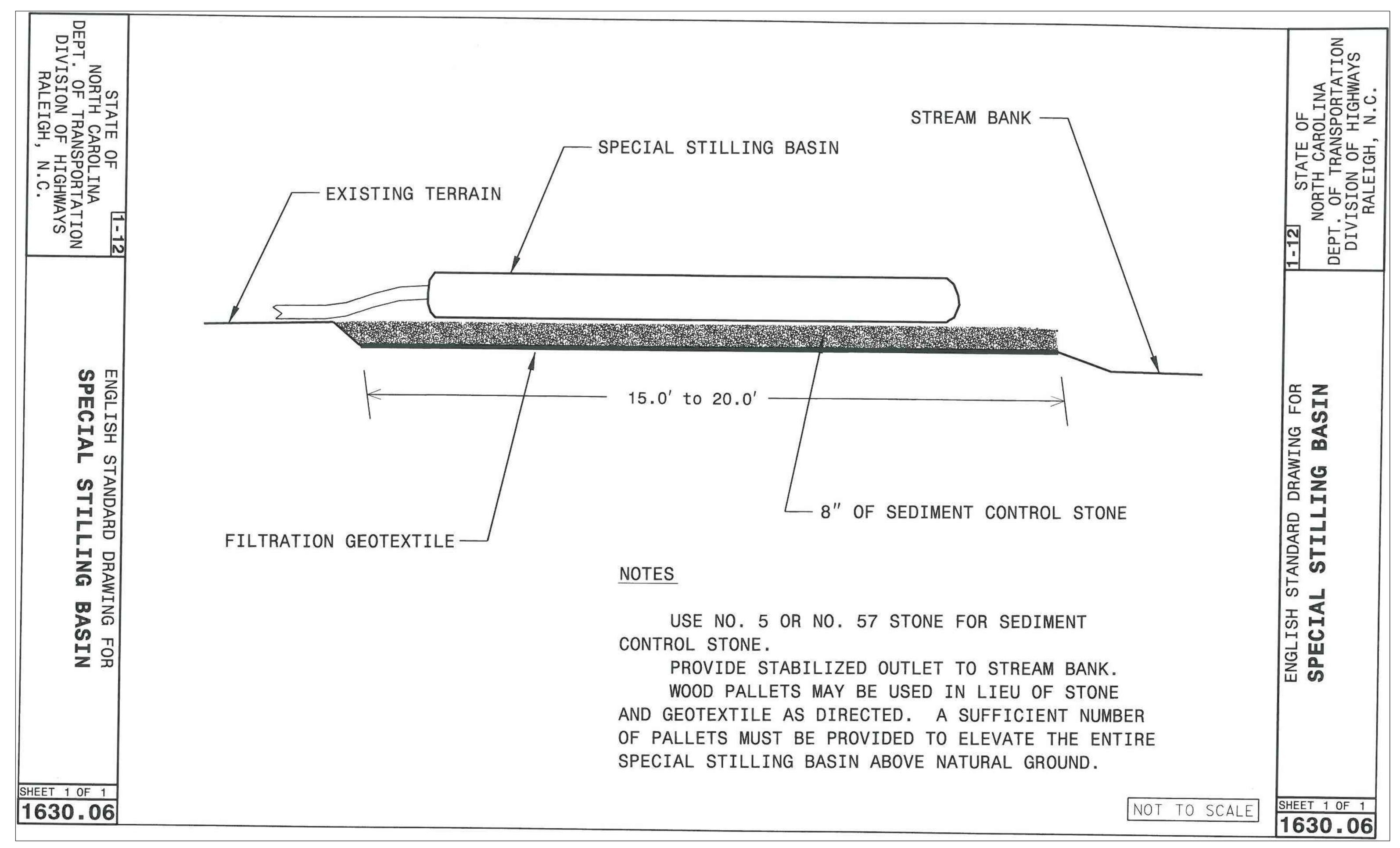
DATE: 1/16/14	CONSTRUCTION DETAILS	JOB NO. 12190
DRAWN BY: WDF		DWG NAME: 12190DETAILS.DWG
CHECKED BY: MDR		SHEET NO. 12 of 17

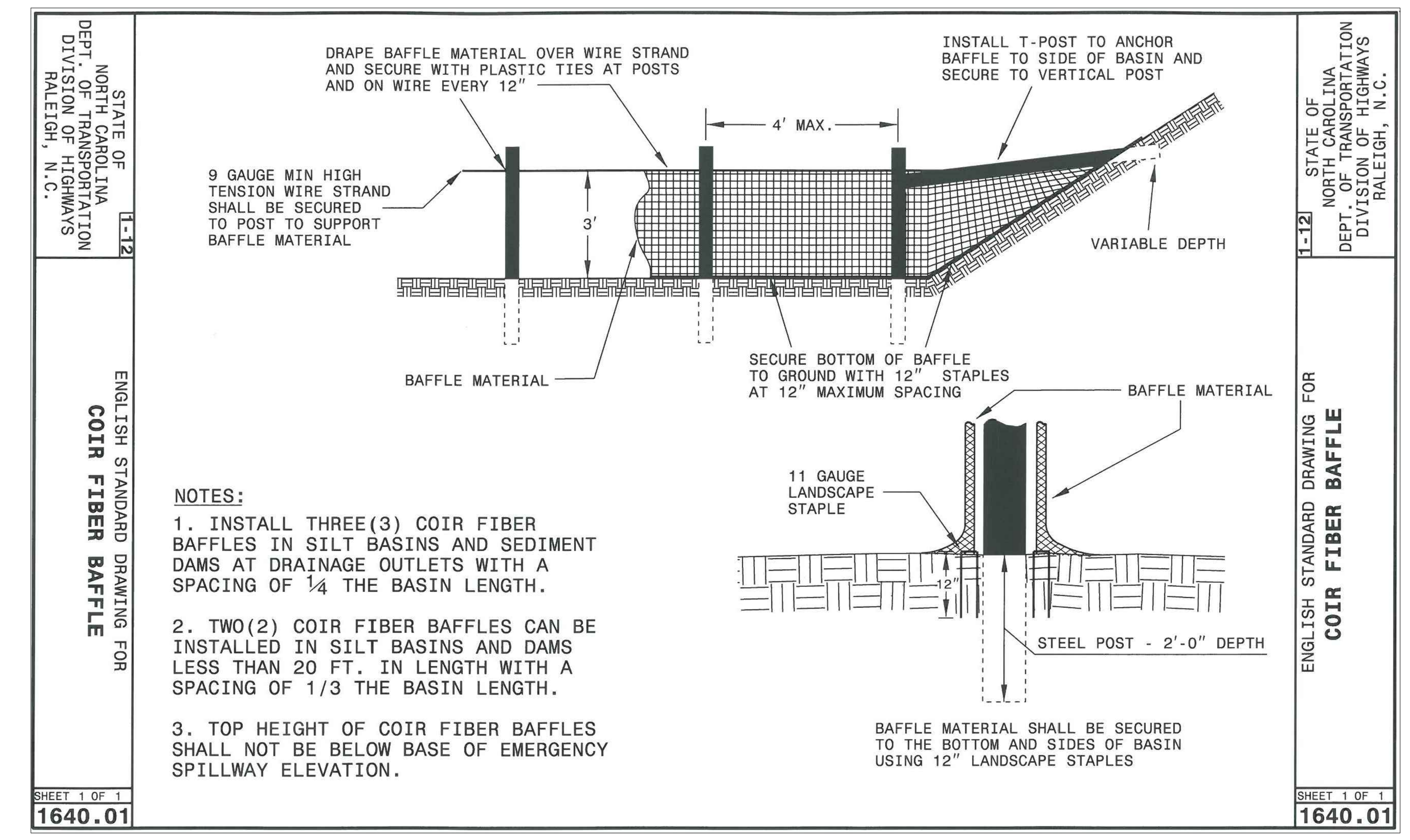


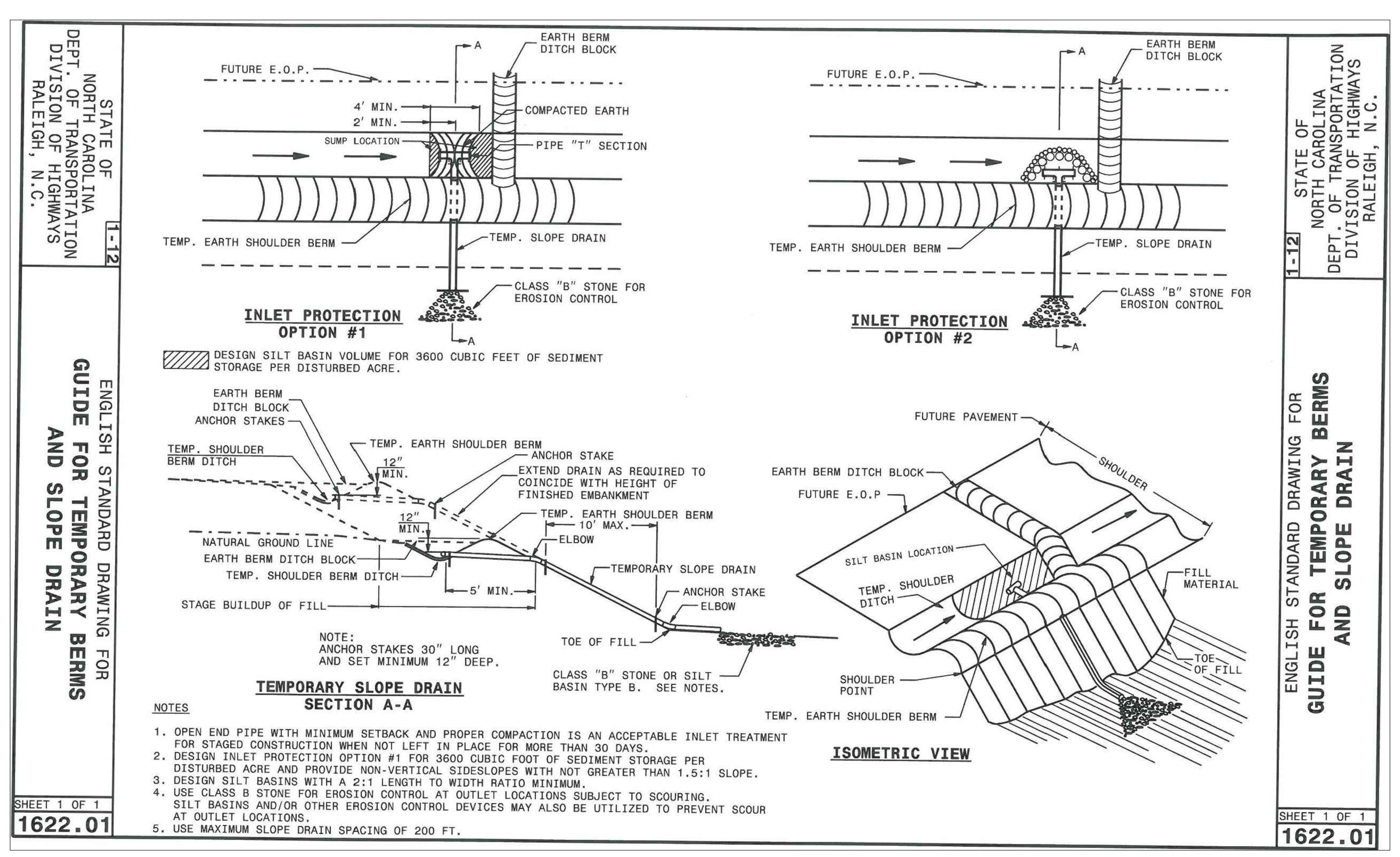


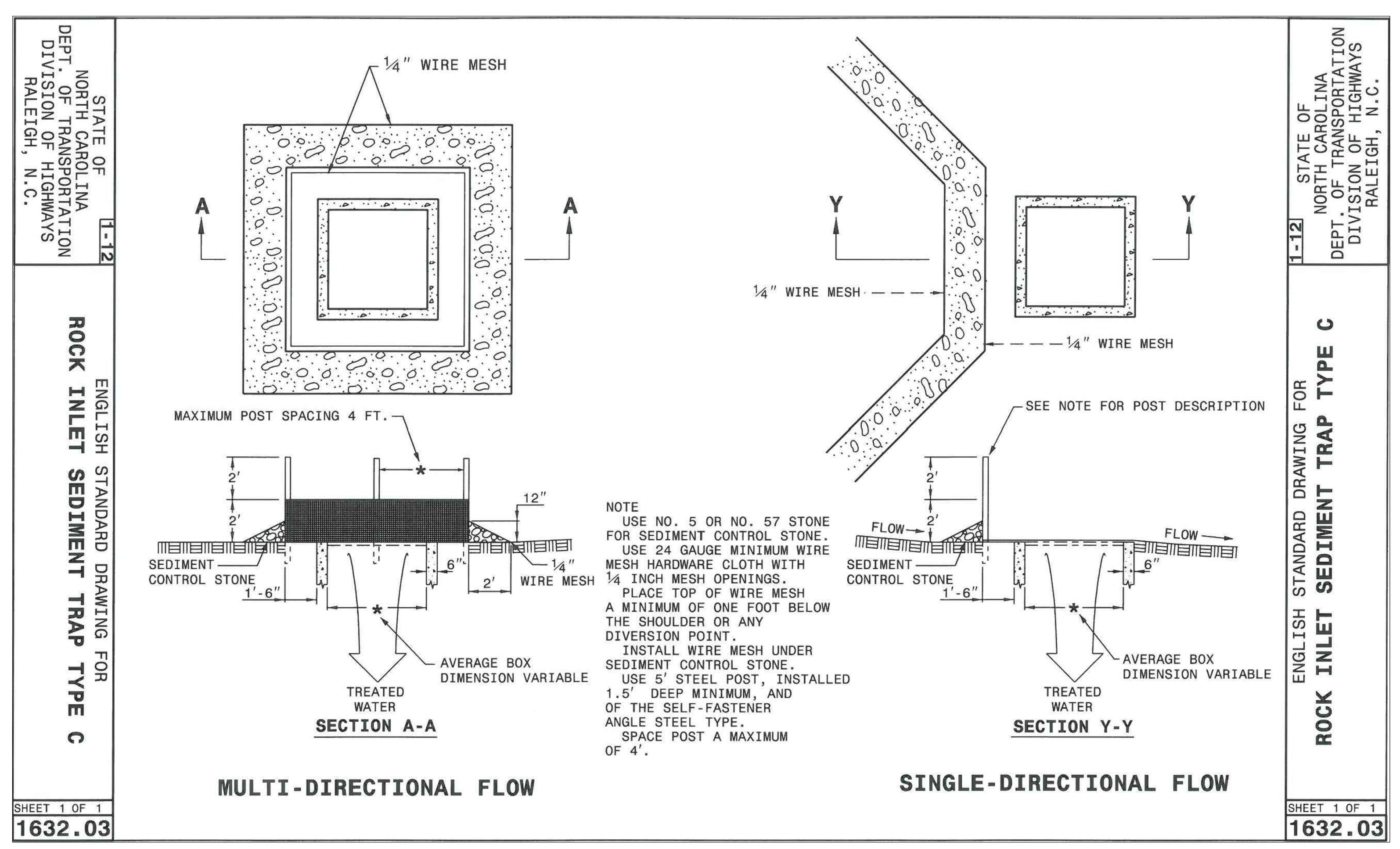












NORTH CAROLINA PROFESSIONAL SEAL 12634 ENGINEER MARK D. REICH
DocuSigned by: Mark D. Reich
58637C049ADB4D7...
4/22/2015

REVISED : 4/17/15 - RELEASED FOR CONSTRUCTION

PROPOSED STREET & SIDEWALK IMPROVEMENTS FOR

TOWN OF ELON

ELON, NORTH CAROLINA
BOONE STATION TOWNSHIP, ALAMANCE COUNTY, NC

alley, williams, carmen & king, inc.
ENGINEERS, ARCHITECTS & SURVEYORS
740 chapel hill road p.o. box 1179
burlington, n.c. 27215 336/226-5534
Firm's Engineering License No. F-0203

DATE: 1/16/14	EROSION CONTROL DETAILS	JOB NO. 12190
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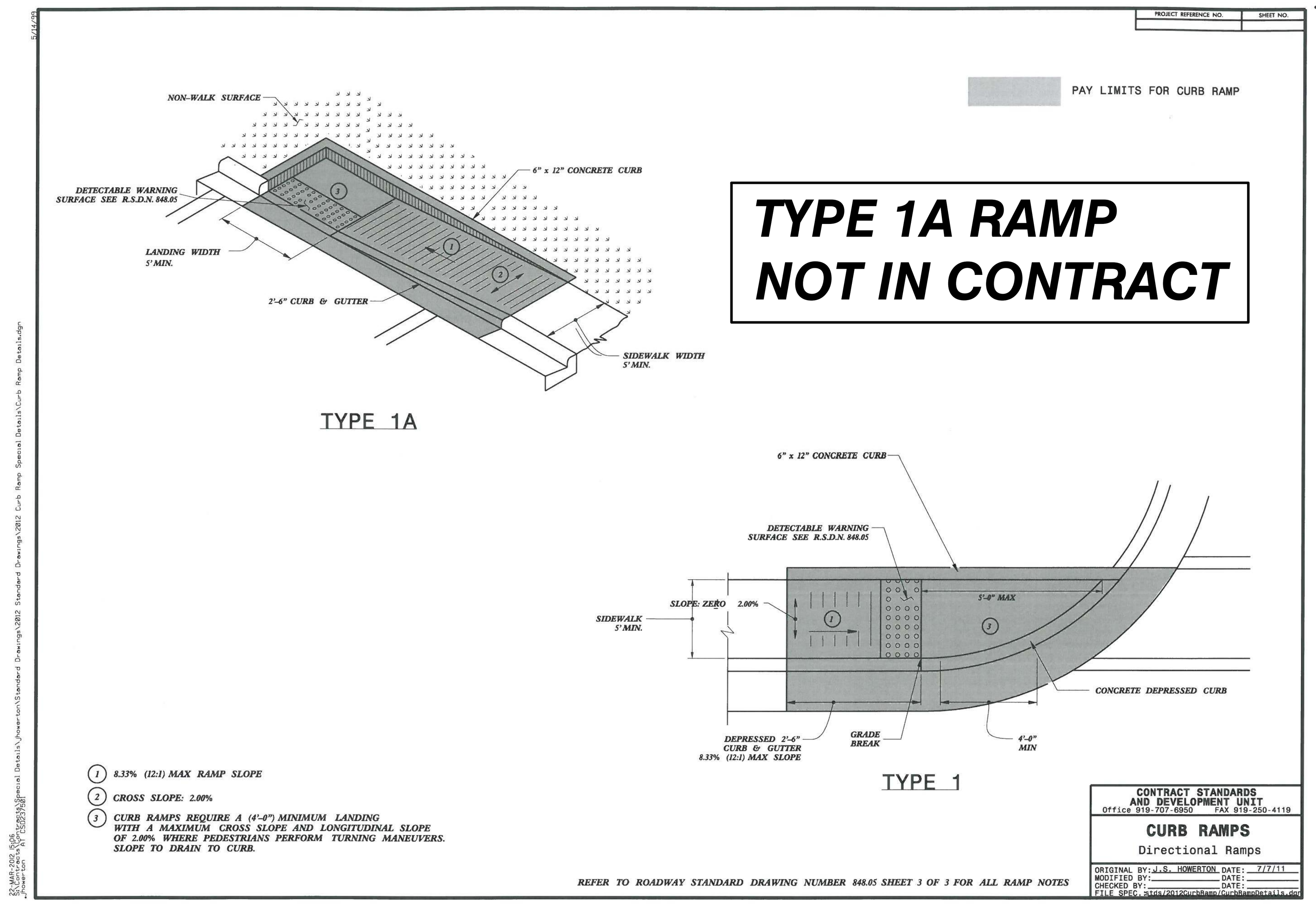
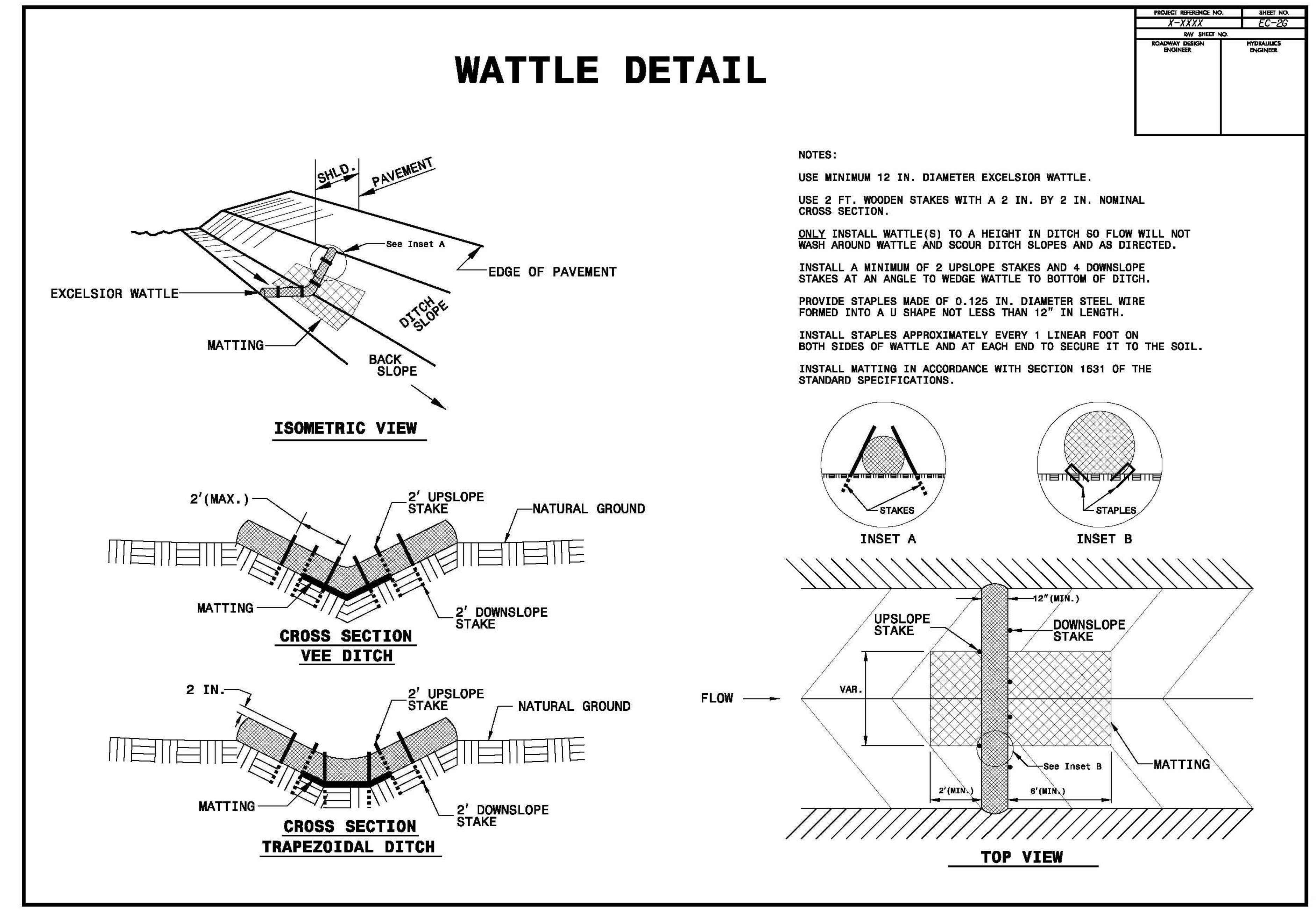
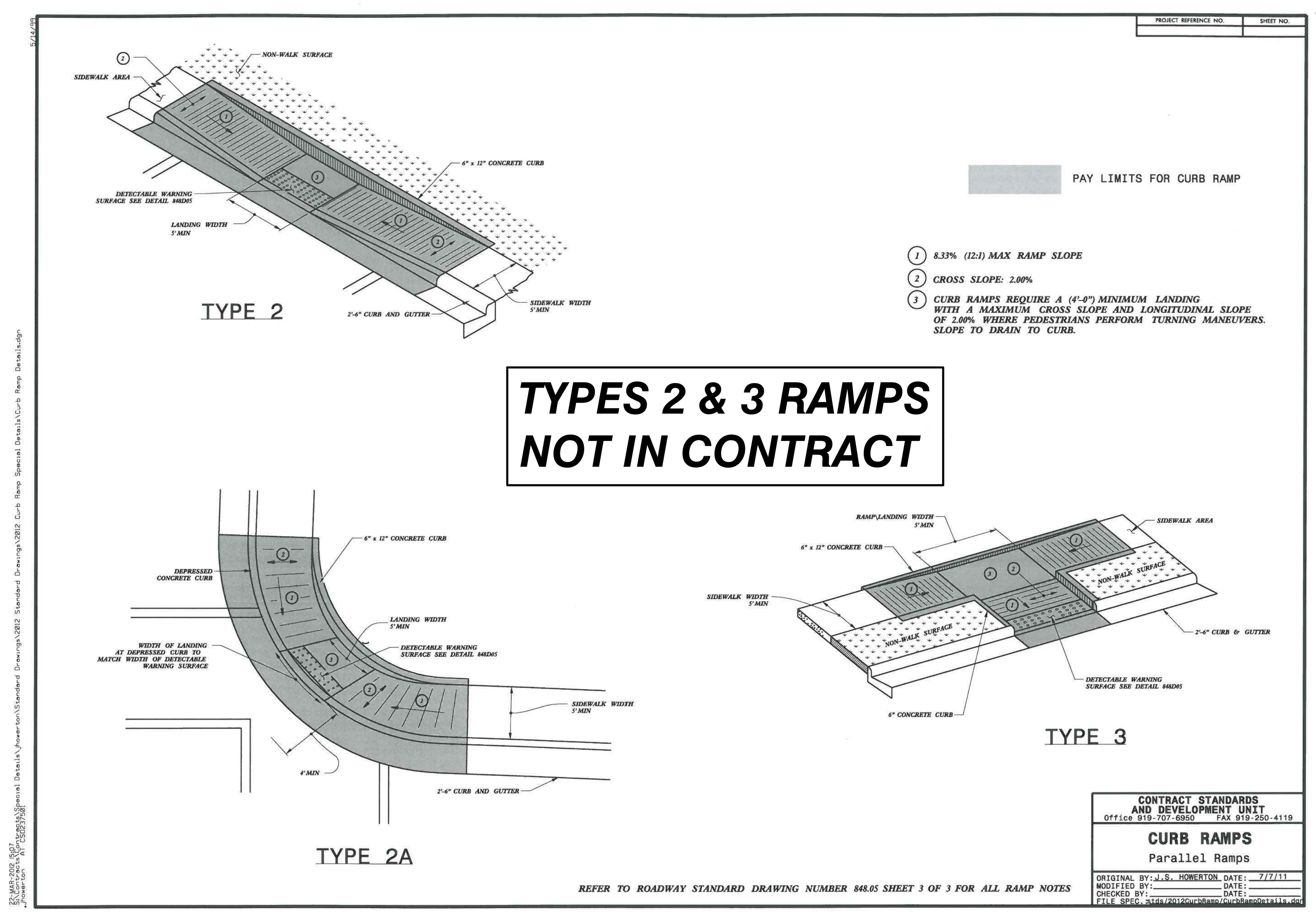
CHECKED BY: MDR		SHEET NO. 13 of 17







CONSTRUCTION SEQUENCE

1. HOLD PRECONSTRUCTION CONFERENCE & CONTACT LOCATING SERVICE TO LOCATE ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
2. INSTALL STATIONARY WORK ZONE SIGNS.
3. INSTALL TEMPORARY SILT FENCE AND SPECIAL SEDIMENT CONTROL FENCE AS SHOWN ON DRAWINGS. NOTE, SILT FENCE INSTALLATION MAY BE PHASED; HOWEVER, FENCE SHALL BE INSTALLED PRIOR TO BEGINNING ANY WORK WITHIN THE DRAINAGE BASIN WHERE THE SILT FENCE IS PROPOSED.
4. INSTALL ROCK SILT CHECK DAMS, EXCAVATE SILT BASIN, INSTALL COIR FIBER BAFFLES & SILT FENCE FROM CHECK DAM TO EDGE OF DISTURBANCE AS DIRECTED BY ENGINEER.
5. INSTALL 24" RCP FROM PIPE END NO. 7 TO JMH NO. 12 INCLUDING 15" RCP FOR DRIVEWAY& PROPOSED DITCH. CONSTRUCT DRAINAGE STRUCTURES & PROVIDE EROSION CONTROL STONE AS DIRECTED BY ENGINEER DURING CONSTRUCTION OF STRUCTURE & PROVIDE INLET PROTECTION (NCDOT STD. 1632.03) AFTER DRAINAGE STRUCTURE IS CONSTRUCTED.
6. INSTALL ROCK SILT CHECK DAMS, SILT BASIN & COIR FIBER BAFFLES DOWNSTREAM OF EXISTING 18" RCP, PIPE END NO. 1 & 4.
7. INSTALL STORM DRAINAGE PIPES FROM PIPE END NO. 1 TO CB NO. 3 & PIPE END NO. 4 TO CB NO. 6.
8. STRIP TOPSOIL AND VEGETATION FROM EDGE OF PAVEMENT TO C/F LINE. MATERIAL MAY BE STOCKPILED ADJACENT TO SILT FENCE AND MAY BE USED IN FILL SLOPE BEYOND WIDTH OF BERM.
9. PROOFROLL SUBGRADE INCLUDING EXISTING DITCH LINES AND UNDERCUT ANY AREAS DEEMED UNACCEPTABLE BY ENGINEER. USE BORROW MATERIAL OR ABC STONE BASE TO STABILIZE AREAS AS DIRECTED BY THE ENGINEER.
10. CONSTRUCT SHOULDER & FILL SLOPE FOR BALL PARK AVENUE INCLUDING BASE DITCH NOS. 2 & 3. INSTALL TEMPORARY BERM AT TOP OF SLOPE AND SLOPE DRAIN TO TOE OF SLOPE. SEED & MULCH SHOULDER & FILL SLOPE & PROVIDE EROSION CONTROL BLANKETS ON FILL SLOPE & BASE DITCHES AS DIRECTED BY THE ENGINEER. INSTALL WATTLES IN BASE DITCHES AS DIRECTED BY ENGINEER.
11. TRENCHING FOR BASE COURSE SHALL BE DONE SUCH THAT ALL EXCAVATED MATERIALS ARE REPLACED WITH 4" ASPHALT BASE COURSE AND THE DROP OFF EDGE ARE REPAIRED PRIOR TO REMOVAL OF LANE CLOSURE & NORMAL 2-WAY TRAVEL RESTORED. POSITIVE DRAINAGE AWAY FROM PAVEMENT TO BE MAINTAINED AT ALL TIMES.
12. INSTALL CURB & GUTTER AND DRIVEWAYS. STAGE CONSTRUCT OF DRIVEWAYS TO PROVIDE INGRESS & EGRESS TO RESIDENTS OR MAKE ACCEPTABLE ARRANGEMENTS WITH PROPERTY OWNERS.
13. BACKFILL CURB & GUTTER & COMPLETE CONSTRUCTION OF BERM & FILL SLOPE..
14. INSTALL INTERMEDIATE ASPHALT COURSE (D1) & BOTTOM LAYER OF SURFACE COURSE (C1) BETWEEN EDGE OF PAVEMENT AND CURB & GUTTER.
15. INSTALL CONCRETE SIDEWALK & DRIVEWAYS.
16. FINE GRADE SHOULDERS TO TYPICAL SECTIONS OR AS DIRECTED BY THE ENGINEER. SEED & MULCH SHOULDERS AND DISTURBED AREAS BETWEEN CURB & SILT FENCE.
17. ONCE ADEQUATE GROUND COVER IS ESTABLISHED, REMOVE SILT FENCE AND SPECIAL SEDIMENT CONTROL FENCE AND REPAIR SEED THE AREAS DISTURBED DURING PROCESS OF FENCE REMOVAL. INSTALL RIP-RAP BASE DITCH NO. 1 & OUTLET PROTECTION FOR PIPE END NOS. 1 & 4. SEED & MULCH ALL DISTURBED AREAS ADJACENT TO BASE DITCH. REMOVE TEMPORARY BERM & SLOP DRAIN ON BALL PARK AVENUE & REPAIR SEED AS DIRECTED BY ENGINEER.
18. REPAIR SEED ANY AREA PREVIOUSLY SEEDED & MULCHED AND WHERE ADEQUATE VEGETATION HAS NOT BEEN ESTABLISHED AS DIRECTED BY THE ENGINEER.

GENERAL EROSION CONTROL NOTES:

1. ALL EROSION CONTROL MEASURES AND DEVICES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH NCDOT & NCDENR - LAND QUALITY SECTION "EROSION AND SEDIMENT CONTROL MANUAL" REQUIREMENTS.
2. ALL SLOPES SHALL BE SEEDED AND MULCHED WITHIN 14 CALENDAR DAYS OF COMPLETION OF GRADING PHASE.
3. REMOVE ANY MUD OR SOIL MATERIALS TRACKED ONTO ADJOINING ROADS IMMEDIATELY.
4. PROVIDE ADDITIONAL MEASURES AS NEEDED TO DIRECT RUNOFF TO EROSION CONTROL DEVICES AS DIRECTED BY THE ENGINEER.
5. INSPECT ALL EROSION CONTROL MEASURES ON A WEEKLY BASIS AND WITHIN 24 HOURS OF A 0.5 IN. RAINFALL EVENT (WITHIN A 24 HOUR PERIOD). CONTRACTOR SHALL REPAIR OR PROVIDE ANY REQUIRED MAINTENANCE NOTED DURING INSPECTION AND PRIOR TO CONTINUING WITH ANY CONSTRUCTION ACTIVITIES.
6. CONTRACTOR SHALL PROVIDE A RAIN GAUGE ON SITE AND SHALL COMPLETE "STORMWATER INSPECTIONS FOR GENERAL PERMIT NCG010000 - LAND DISTURBING ACTIVITIES" FORM ON A WEEKLY BASIS. PROVIDE COPIES OF REPORT TO OWNER/ENGINEER ON A MONTHLY BASIS.
7. ANY WASTE MATERIAL DISPOSED OF OFF-SITE SHALL BE DISPOSED OF TO A SITE APPROVED BY NCDENR, LQS.
8. ANY BORROW MATERIAL SHALL BE OBTAINED FROM AN NCDENR, LQS APPROVED SITE.
9. PROVIDE COPIES OF APPROVAL LETTERS FOR WASTE/BORROW SITES TO ENGINEER PRIOR TO DISPOSING OF OR OBTAINING MATERIAL FROM SITES.
10. CONTRACTOR SHALL PROVIDE ENGINEER WITH A COPY OF THE CERTIFICATION OF ALL EMPLOYEES MAINTAINING AND INSTALLING EROSION CONTROL DEVICES.

BALL PARK AVENUE AREA EROSION CONTROL NOTES:

1. PROVIDE A TEMPORARY BERM & SLOPE DRAIN ALONG TOP OF SLOPE FROM STA. 0+50± TO STA. 2+30± (SEE NCDOT STD. DETAIL 1622.01).
2. PROVIDE A SPECIAL STILLING BASIN (SEE NCDOT STD. DETAIL 1630.06) IF GROUNDWATER ENCOUNTERED DURING STORM SEWER INSTALLATION.
3. PROVIDE TYPE 'C' ROCK INLET SEDIMENT TRAP PROTECTION (SEE NCDOT STD. DETAIL 1632.03) AT ALL CATCH BASINS/JUNCTION MANHOLES WHERE DISTURBED SOIL DRAINS TO A DRAINAGE STRUCTURE.
4. PROVIDE TYPE 'B' ROCK SILT CHECK DAMS (SEE NCDOT STD. DETAIL 1633.02) IN EXISTING OR CONSTRUCTED DITCHES AS SHOWN ON PLANS OR AS DIRECTED BY ENGINEER.
5. PROVIDE COIR FIBER BAFFLES IN SEDIMENT PITS WHERE SHOWN ON DRAWINGS OR AS DIRECTED BY ENGINEER.
6. PROVIDE WATTLES IN GRASS LINED DITCHES AS DIRECTED BY ENGINEER TO ASSIST WITH ESTABLISHMENT OF PERMANENT VEGETATION. IN GENERAL, WATTLE SPACING SHALL BE 50'±.
7. PROVIDE EROSION CONTROL BLANKETS ON FILL SLOPE OF BALL PARK AVENUE STA. 1+00 TO STA. 2+30 & BOTTOM OF BASE DITCH NOS. 2 & 3.

SEE PROJECT SPECIAL PROVISIONS FOR SEEDING/MULCHING REQUIREMENTS

NORTH CAROLINA PROFESSIONAL SEAL 12634 ENGINEER MARK D. REICH
DocuSigned by: Mark D. Reich 58237F049ADB4D7...
4/22/2015

REVISED : 4/17/15 - RELEASED FOR CONSTRUCTION
REVISED : 4/17/15 - ADDED TYPE 1 CURB RAMP DETAIL

PROPOSED STREET & SIDEWALK IMPROVEMENTS FOR

TOWN OF ELON

ELON, NORTH CAROLINA
BOONE STATION TOWNSHIP, ALAMANCE COUNTY, NC

alley, williams, carmen & king, inc.
ENGINEERS, ARCHITECTS & SURVEYORS
740 chapel hill road p.o. box 1179
burlington, n.c. 27215 336/226-5534
Firm's Engineering License No. F-0203

DATE: 1/16/14	EROSION CONTROL NOTES	JOB NO. 12190
DRAWN BY: WDF		DWG NAME: 12190DETAILS.DWG
CHECKED BY: MDR		SHEET NO. 14 of 17

OVERALL MAP

SCALE: 1" = 100'

GENERAL TRAFFIC CONTROL NOTES

1. CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL IN ACCORDANCE WITH ALL NCDOT AND MUTCD SPECIFICATIONS AND REQUIREMENTS.
2. CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN DETAIL DRAWINGS, STANDARD DETAILS AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS, OR RESULT IN DUPLICATE, OR UNDESIRABLE OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING OR REMOVAL OF DEVICES, AS DIRECTED BY THE ENGINEER.
3. CONTRACTOR SHALL PROVIDE STATIONARY WORK ZONE SIGNS (ROAD CONSTRUCTION AHEAD AND END CONSTRUCTION) AS SHOWN ON TRAFFIC CONTROL PLAN OR AS DIRECTED BY ENGINEER.
4. INSTALL STATIONARY ADVANCE WORK ZONE WARNING SIGNS A MINIMUM OF 3 DAYS PRIOR TO BEGINNING WORK.
5. FLAGGERS SHALL BE CERTIFIED IN WORK ZONE TRAFFIC CONTROL OPERATIONS.
6. PROVIDE CHANGEABLE MESSAGE SIGNS ON EACH END OF PROJECT AS SHOWN ON THE TRAFFIC CONTROL PLAN. MESSAGE SHALL BE AS DIRECTED BY ENGINEER & REVISED PERIODICALLY AS DIRECTED BY ENGINEER.

LANE AND SHOULDER CLOSURE REQUIREMENTS

1. REMOVE LANE CLOSURE DEVICES FROM THE LANE WHEN WORK IS NOT BEING PERFORMED BEHIND THE LANE CLOSURE OR WHEN A LANE CLOSURE IS NO LONGER NEEDED, OR AS DIRECTED BY THE ENGINEER.
2. WHEN WORKING WITHIN 8 FEET OF FACE OF CURB, OR 10' OF EDGE OF PAVEMENT, CONTRACTOR WILL BE ALLOWED TO CLOSE ADJACENT TRAVEL LANE, PROVIDED TRAFFIC CONTROL IS MAINTAINED IN ACCORDANCE WITH EITHER METHOD A, B OR C AS FOLLOWS:
   A. SKINNY DRUMS ARE USED TO PROVIDE 2 TRAVEL LANES, ONE IN EACH DIRECTION WITH A MINIMUM LANE WIDTH OF 10' EACH AND 10 FEET OF CLEARANCE BETWEEN TRAVEL LANE AND WORK ZONE.
   B. PROVIDE FLAGGERS AND SHIFT TRAFFIC TO OPPOSITE LANE PER NCDOT STANDARDS.
   C. CONTRACTOR PROVIDES WATER FILLED OR CONCRETE BARRIERS IMMEDIATELY ADJACENT TO THE WORK ZONE AREA AS DIRECTED BY THE ENGINEER.
   CONTRACTOR SHALL PROVIDE PERSONNEL AND EQUIPMENT FOR EITHER METHOD A, B OR C IN ACCORDANCE WITH NCDOT STANDARDS, INCLUDING ALL PORTABLE SIGNS.
3. PROVIDE PORTABLE TRAFFIC CONTROL SIGNS AND CHANNELIZING DEVICES TO SHIFT TRAFFIC AS SHOWN ON STANDARD DRAWING 1101.02 OR AS DIRECTED BY THE ENGINEER.
4. SPACE CHANNELIZING DEVICES IN WORK AREA AT 40 FT MAX ON CENTER IN TANGENT SECTIONS AND 10 FT MAX ON CENTER IN RADII SECTIONS. CHANNELIZING DEVICES SHALL BE AT LEAST 3 FT OFF EDGE OF AN OPEN TRAVEL WAY WHEN LANE CLOSURES ARE NOT IN EFFECT.

PAVEMENT EDGE DROP OFF REQUIREMENTS

1. BACKFILL AT A 6:1 SLOPE UP TO THE EDGE AND ELEVATION OF THE EXISTING PAVEMENT WHERE THE DROP OFF EXCEEDS 2 INCHES. BACKFILL MATERIAL SHALL BE COMPACTED AND APPROVED BY THE ENGINEER AS SUITABLE MATERIAL FOR THE INTENDED PURPOSE. BACKFILL MATERIAL SHALL BE PROVIDED BY THE CONTRACTOR AT NO EXPENSE TO THE OWNER. WHEN DIRECTED BY THE ENGINEER, THE CONTRACTOR SHALL PROVIDE ABC STONE BASE AND WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR INCIDENTAL STONE.

┤ DENOTES STATIONARY TRAFFIC CONTROL SIGN

TRAFFIC CONTROL WORK RESTRICTIONS

LANE CLOSURES WILL NOT BE ALLOWED BETWEEN 7:00 AM - 9:00 AM AND FROM 4:00 PM - 7:00 PM, MONDAY THRU FRIDAY, UNLESS OTHERWISE APPROVED BY THE ENGINEER.

SIGN SUMMARY

STATIONARY SIGNS

TYPE	DESCRIPTION	SIZE	QUANTITY
W20-1	ROAD WORK AHEAD	48" X 48"	7
G20-2a	END ROAD WORK	48" X 24"	7

CONTRACTOR SHALL PROVIDE ALL OTHER REQUIRED SIGNAGE IN ACCORDANCE WITH NCDOT REQUIREMENTS TO TEMPORARILY CLOSE TRAVEL LANES ADJACENT TO WORK ZONE.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12634 MARK D. REICH
DocuSigned by: Mark D. Reich
58637F049ADB4D7...
4/22/2015

REVISED : 4/17/15 - RELEASED FOR CONSTRUCTION

PROPOSED STREET & SIDEWALK IMPROVEMENTS FOR

TOWN OF ELON

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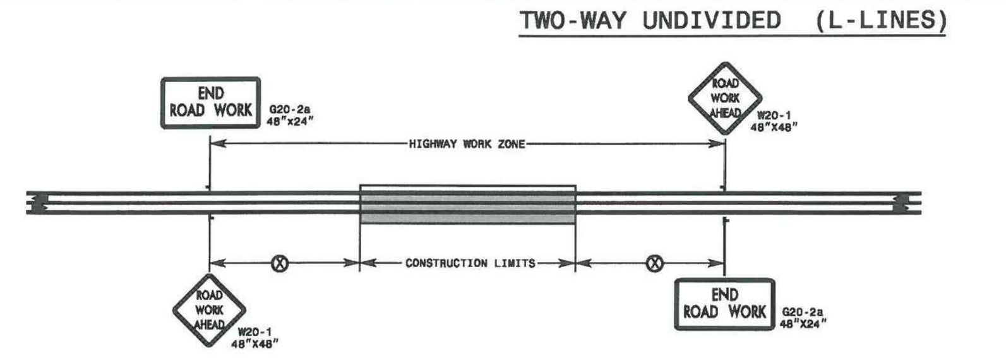
DATE: 1/16/14	TRAFFIC CONTROL PLAN	JOB NO. 12190
DRAWN BY: WDF		DWG NAME: 12190TRAFFIC.DWG
CHECKED BY: MDR		SHEET NO. 15 of 17

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-12

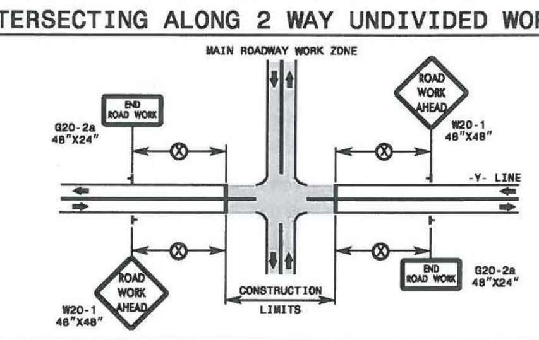
ENGLISH STANDARD DRAWING FOR **DETAIL DRAWING FOR TWO-WAY UNDIVIDED WORK ZONE WARNING SIGNS**

TWO-WAY UNDIVIDED (L-LINES)



POSTED SPEED LIMIT (MPH)	RECOMMENDED MINIMUM SIGN SPACING ⊗
≤ 50	500'
55	1000'

ROADWAYS INTERSECTING ALONG 2 WAY UNDIVIDED WORK ZONE (Y-LINES)



GENERAL NOTES

1- USE FLUORESCENT ORANGE SHEETING (TYPE VII OR HIGHER) ON ALL ADVANCED WORK ZONE SIGNS.

2- DO NOT INSTALL ADVANCE WARNING SIGNS MORE THAN 3 DAYS PRIOR TO BEGINNING OF WORK, UNLESS COVERED.

3- SIGNS SHOWN ARE REQUIRED FOR WORK ZONES THAT WILL REMAIN IN EFFECT OVERNIGHT. FOR SHORT-TERM DAILY MAINTENANCE TYPE OPERATIONS, THIS SIGNING APPLICATION IS OPTIONAL; MAY USE ONLY APPLICABLE ROADWAY STANDARD DRAWINGS INSTEAD. HOWEVER, IF THIS SIGNING APPLICATION IS USED, SIGNS MAY BE PORTABLE MOUNTED.

4- ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE, FIELD ADJUST AS NECESSARY OR AS DIRECTED.

5- USE 3LB STEEL U-CHANNEL POST OR 4" X 4" WOOD POST FOR ALL WORK ZONE SIGNS. 3LB STEEL U-CHANNEL POSTS MUST MEET THE REQUIREMENTS OF STANDARD SPECIFICATION SECTION 1094-1(B), MAY BE GALVANIZED STEEL, OR MAY BE PAINTED GREEN BY THE POST MANUFACTURER. SQUARE STEEL TUBING POSTS HAVING EQUIVALENT STRENGTH OF THE 3 LB STEEL U-CHANNEL POST ARE ALSO ACCEPTABLE FOR USE. ERECT SIGNS PER ROADWAY STANDARD DRAWING 1110.01. PAYMENT FOR WOOD POSTS, 3LB STEEL U-CHANNEL AND SQUARE STEEL TUBING POSTS WITH SIGNS WILL BE MADE ACCORDING TO STANDARD SPECIFICATION "WORK ZONE SIGNS" SECTION 1110.

6- WHEN NECESSARY, USE SPLICING IN ACCORDANCE WITH ROADWAY STANDARD DRAWING NO. 1110.01.

7- DO NOT BACK BRACE SIGN SUPPORTS.

LEGEND
- ⊢ STATIONARY SIGN
- ← DIRECTION OF TRAFFIC FLOW

SHEET 3 OF 3 — 1101.01

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-12

ENGLISH STANDARD DRAWING FOR **TRAFFIC CONTROL DESIGN TABLES** BUFFER SPACE & SIGHT DISTANCE

DESIGN SPEED (MPH)	MINIMUM SIGHT DISTANCE: STOPPING SIGHT DISTANCE (FEET)	MINIMUM SIGHT DISTANCE: PASSING SIGHT DISTANCE (FEET)	MINIMUM LONGITUDINAL BUFFER SPACE (FEET)
30	200	1090	85
35	250	1280	120
40	305	1470	155
45	360	1625	195
50	425	1835	240
55	495	1985	290
60	570	2135	345
65	645	2285	405
70	730	2480	470
75	820	2580	540
80	910	2680	615

GENERAL NOTES

1- TABLES ARE BASED ON THE AASHTO GREEN BOOK "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AND THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES". MINIMUM SIGHT DISTANCE VALUES ARE FOR PASSENGER CAR VEHICLES ON WET AND LEVEL ROADWAYS. CONSULT THE AASHTO GREEN BOOK TO MAKE FINAL DETERMINATION OF STOPPING SIGHT DISTANCE REQUIREMENTS.

2- BUFFER SPACE TABLE IS BASED ON THE BRAKING DISTANCE PORTION OF STOPPING SIGHT DISTANCE FOR WET AND LEVEL PAVEMENTS.

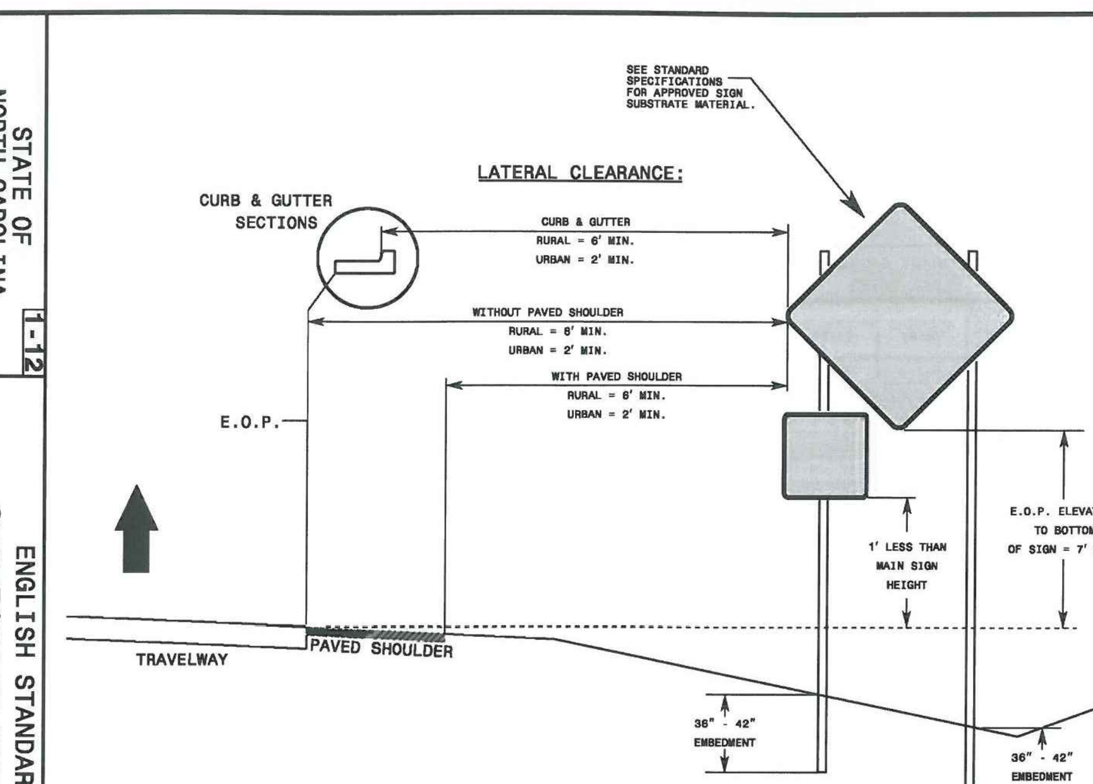
3- USE OF STOPPING SIGHT DISTANCE IN TRAFFIC CONTROL PLAN APPLICATIONS INCLUDES PROVIDING SIGHT DISTANCE FOR TRAFFIC APPROACHING A LANE CLOSURE. PROVIDE 2-LANE, 2-WAY ROADWAYS STOPPING SIGHT DISTANCE TO THE FLAGGER. FOR LANE CLOSURES ON MULTILANE ROADWAYS PROVIDE STOPPING SIGHT DISTANCE TO THE BEGINNING OF THE LANE CLOSURE MERGE TAPER, OR FLASHING ARROW BOARD. EXTEND LANE CLOSURES AT THE BUFFER SPACE SUCH THAT STOPPING SIGHT DISTANCE IS PROVIDED.

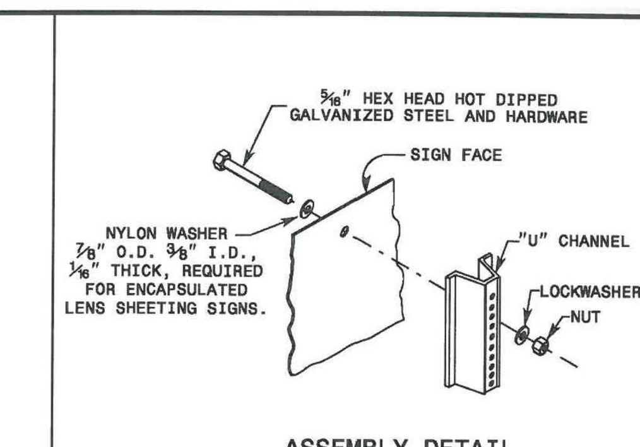
4- USE OF MINIMUM PASSING SIGHT DISTANCE TABLE IN TRAFFIC CONTROL PLAN APPLICATIONS INCLUDES PROVIDING SIGHT DISTANCE REQUIREMENTS FOR PLACEMENT OF PAVEMENT MARKING PASSING/NO-PASSING ZONES FOR 2-LANE, 2-WAY ROADWAYS.

SHEET 2 OF 4 — 1101.11

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-12

ENGLISH STANDARD DRAWING FOR **STATIONARY WORK ZONE SIGNS** MOUNTING HEIGHT & LATERAL CLEARANCE





ASSEMBLY DETAIL

GENERAL NOTES

1- DIMENSIONS SHOWN ARE MINIMUM VALUES. WHEN SIGNS ARE MOUNTED BEHIND TRAFFIC CONTROL DEVICES SUCH AS DRUMS, BARRIER, OR OTHER OBJECTS THAT DETRACT FROM THEIR VISIBILITY, MOUNT THE SIGNS AT AN APPROPRIATE HEIGHT SUCH THAT THEY ARE CLEARLY VISIBLE TO APPROACHING TRAFFIC.

2- MOUNT SIGNS THAT ARE LARGER THAN 10 SQUARE FEET IN AREA ON TWO OR MORE WOOD OR U-CHANNEL SUPPORTS. PERFORATED SQUARE TUBING SUPPORT SYSTEMS MAY SUPPORT LARGER AREAS ON A SINGLE SUPPORT. FOLLOW MANUFACTURER'S RECOMMENDATIONS. THESE SYSTEMS SHALL BE NCHRP 350 COMPLIANT AND NCDOT APPROVED.

3- SEE STANDARD SPECIFICATION 1089-1 FOR WORK ZONE SIGNS.

4- SEE STANDARD SPECIFICATION 1089-2 FOR WORK ZONE SIGN SUPPORTS.

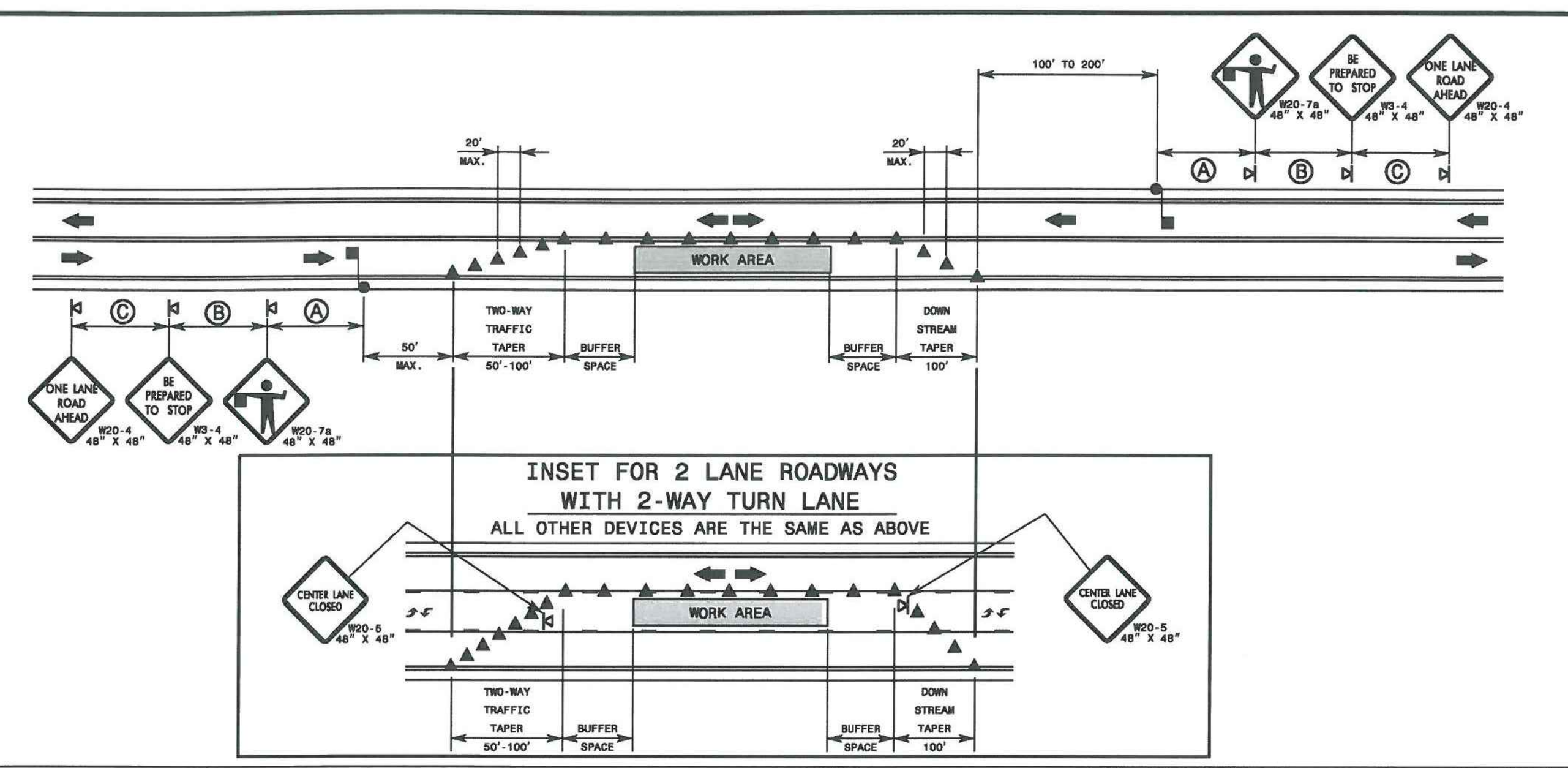
5- SEE ROADWAY STANDARD DRAWING 903.20 FOR WOOD POSTS.

6- SEE STANDARD SPECIFICATION 903-1 FOR WOOD SUPPORTS.

SHEET 1 OF 3 — 1110.01

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-12

ENGLISH STANDARD DRAWING FOR **TEMPORARY LANE CLOSURES** 2-LANE, 2-WAY ROADWAY-1 LANE CLOSED



GENERAL NOTES FOR FLAGGER OPERATIONS

1- REFER TO STD. 1101.11 SHEET 4 FOR SIGN SPACING.

2- INSTALL LANE CLOSURES WITH THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE UPSTREAM SIDE OF TRAFFIC.

3- REMOVE LANE CLOSURES AGAINST THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.

4- PLACE CONES THRU THE WORK AREA AT THE MAXIMUM SPACING EQUAL IN FEET TO 2 TIMES THE POSTED SPEED LIMIT.

5- EXTEND LANE CLOSURES AT THE BUFFER SPACE SUCH THAT STOPPING SIGHT DISTANCE IS PROVIDED TO THE FLAGGER (REFER TO STD. 1101.11 SHEET 2).

6- DO NOT STOP TRAFFIC IN ANY ONE DIRECTION FOR MORE THAN 5 MINUTES AT A TIME.

7- DRUMS OR SKINNY-DRUMS MAY BE USED IN LIEU OF CONES. REFER TO ROADWAY STANDARD DRAWING 1180.01 FOR SKINNY-DRUM REQUIREMENTS.

8- USE FLAGGERS TO CONTROL TRAFFIC AT INTERSECTIONS AFFECTED BY THE LANE CLOSURE. SUPPLEMENT FLAGGERS LOCATED AT INTERSECTIONS WITH FLAGGER AHEAD SIGNS (W20-7a) PLACED APPROXIMATELY 250 FT. IN ADVANCE OF THE FLAGGER. FOR SIGNALIZED INTERSECTIONS PLACE SIGNALS IN THE FLASH MODE AND RECOMMEND THE USE OF LAW ENFORCEMENT.

9- REFER TO 2009 MUTCD, CHAPTER 6, FOR FLAGGER CONTROL, REQUIREMENTS, AND PROCEDURES.

10- DO NOT EXCEED A 1 MILE LANE CLOSURE LENGTH UNLESS OTHERWISE SHOWN IN THE TMP OR AS DIRECTED BY THE ENGINEER.

GENERAL NOTES FOR PILOT CAR OPERATIONS

1- USE PILOT CARS WHEN DIRECTED BY THE ENGINEER.

2- IF ROADWAY WIDTH IS LESS THAN 22 FEET (EOP TO EOP), CONES MAY NOT BE REQUIRED ALONG WORK AREA, AND AT THE DISCRETION OF THE ENGINEER, CONES MAY BE OMITTED ALONG THE WORK AREA IF USING A PILOT CAR.

3- CONES ARE ALWAYS REQUIRED IN THE UPSTREAM AND DOWNSTREAM TAPERS.

4- MOUNT SIGN G20-4 "PILOT CAR FOLLOW ME" AT A CONSPICUOUS POSITION ON THE REAR OF THE PILOT VEHICLE.

5- DO NOT INSTALL MORE THAN ONE (1) MILE OF LANE CLOSURE, MEASURED FROM THE BEGINNING OF THE MERGE TAPER TO THE END OF THE LANE CLOSURE.

6- ADVISE RESIDENTS AND BUSINESSES WITHIN THE LANE CLOSURE LIMITS ABOUT METHODS OF SAFE EGRESS AND INGRESS FROM DRIVEWAYS DURING FLAGGING AND PILOT CAR OPERATIONS.

LEGEND
- FLAGGER
- ▲ CONE
- PORTABLE SIGN
- ← DIRECTION OF TRAFFIC FLOW

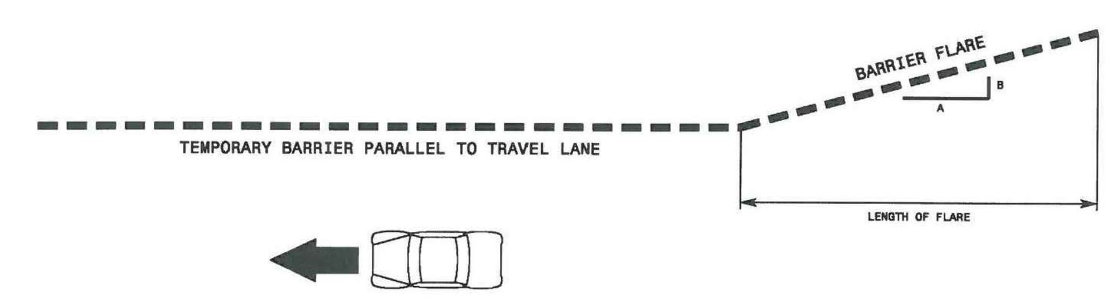
SHEET 1 OF 15 — 1101.02

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-12

ENGLISH STANDARD DRAWING FOR **TRAFFIC CONTROL DESIGN TABLES** TEMPORARY BARRIER FLARE RATES

TEMPORARY BARRIER FLARE RATES

POSTED SPEED LIMIT (MPH)	ANCHORED (A:B)	UNANCHORED (A:B)
≤ 30	8 : 1	7 : 1
35	9 : 1	8 : 1
40	10 : 1	8 : 1
45	12 : 1	10 : 1
50	14 : 1	11 : 1
55	16 : 1	12 : 1
60	18 : 1	14 : 1
65	19 : 1	15 : 1
70	20 : 1	15 : 1



GENERAL NOTES

1- REFER TO 2002 ROADSIDE DESIGN GUIDE.

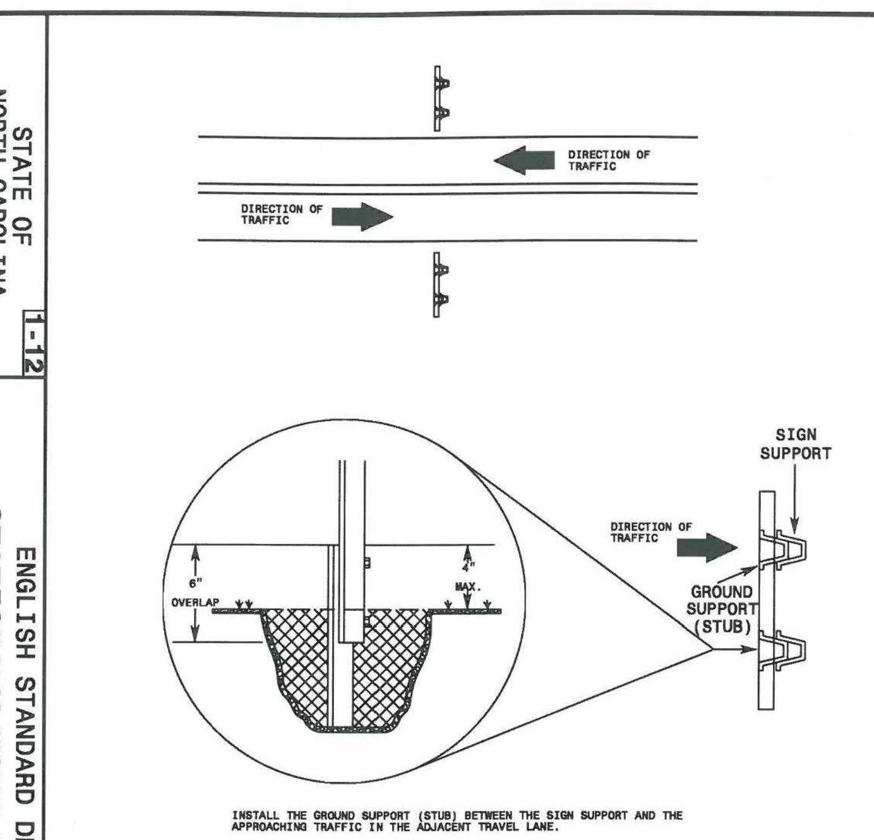
2- A BARRIER IS CONSIDERED FLARED WHEN IT IS NOT PARALLEL TO THE EDGE OF THE TRAVELWAY.

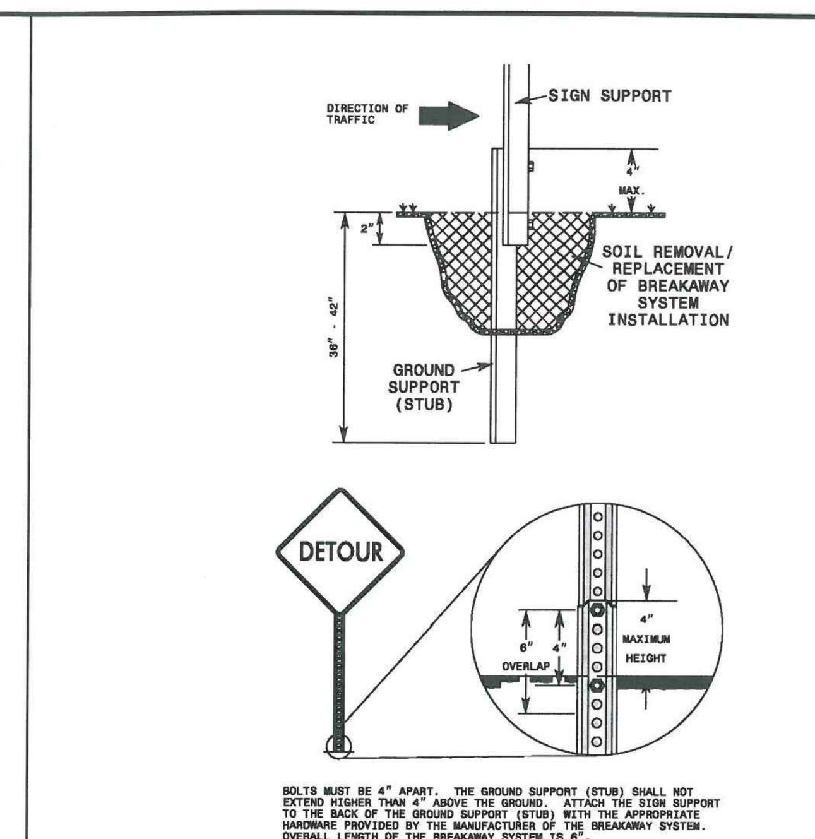
3- THE PRIMARY USE OF BARRIERS ARE FOR WORK AREA PROTECTION. WHEN SERVING THE ADDITIONAL FUNCTION OF A CHANNELIZING DEVICE, SUCH AS WHEN SHIFTING TRAFFIC, BARRIER TAPERS SHALL MEET STANDARD CHANNELIZING TAPER LENGTHS AS SHOWN ON STD. 1101.11 SHEET 1.

SHEET 3 OF 4 — 1101.11

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-12

ENGLISH STANDARD DRAWING FOR **STATIONARY WORK ZONE SIGNS** SPLICING DETAIL





GENERAL NOTES

1- ALL TRAFFIC CONTROL DEVICES, INCLUDING BREAKAWAY SYSTEMS FOR GROUND MOUNTED SIGN SUPPORTS, COMPLY WITH ALL NCHRP REPORT 350 REQUIREMENTS AND SHALL BE APPROVED BY THE DEPARTMENT. ALL APPROVED TRAFFIC CONTROL DEVICES ARE ON THE DEPARTMENT'S WEB SITE AT: https://apps.dot.state.nc.us/vendor/approvedproducts.

2- INSTALL THE BREAKAWAY SYSTEM TO FUNCTION PROPERLY IN ACCORDANCE WITH THE DIRECTION OF TRAFFIC ADJACENT TO THE SIGN.

3- FOR PERFORATED SQUARE TUBING BREAKAWAY SYSTEMS, FOLLOW THE MANUFACTURER'S RECOMMENDATIONS FOR ANCHOR EMBEDMENT DEPTHS AND POST ATTACHMENT REQUIREMENTS.

3 LB. U-CHANNEL SPLICING REQUIREMENTS

1- WHEN SIGN IS REMOVED AT THE END OF PROJECT, REMOVE THE GROUND SUPPORT (STUB).

2- WHEN SPLICING A U-CHANNEL SUPPORT, INSTALL THE GROUND SUPPORT (STUB) APPROXIMATELY 36" TO 42" INTO THE GROUND WHILE LEAVING NO MORE THAN 4" ABOVE THE EXISTING GROUND ELEVATION. REMOVE ENOUGH SOIL FROM AROUND THE GROUND SUPPORT (STUB) TO PERMIT ACCESS TO THE HOLES FOR THE BREAKAWAY SYSTEM. ONCE THE BREAKAWAY SYSTEM IS TIGHTENED, REPLACE THE SOIL AND TAMP.

3- OVERALL LENGTH OF THE BREAKAWAY SYSTEM IS 6". BOLTS MUST BE 4" APART. ATTACH THE SIGN SUPPORT TO THE BACK OF THE GROUND SUPPORT (STUB) WITH THE APPROPRIATE HARDWARE SUPPLIED BY THE MANUFACTURER OF THE BREAKAWAY SYSTEM.

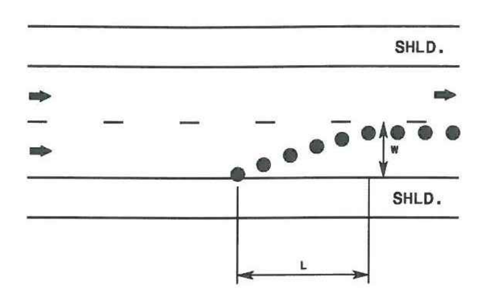
4- INSTALL U-CHANNEL BREAKAWAY SYSTEMS SO THE GROUND SUPPORT (STUB) IS INSTALLED ON THE APPROACH SIDE OF TRAFFIC WHILE THE SIGN SUPPORT IS ATTACHED/SPLICED BEHIND THE GROUND SUPPORT (STUB).

SHEET 2 OF 3 — 1110.01

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-12

ENGLISH STANDARD DRAWING FOR **TRAFFIC CONTROL DESIGN TABLES** "L" DISTANCE AND CHANNELIZING DEVICE TAPER CRITERIA

EXAMPLE OF "L" & "W" DESIGNATIONS



TAPER LENGTH CRITERIA FOR CHANNELIZING DEVICES IN WORK ZONES

TYPES OF TAPERS	TAPER LENGTH
UPSTREAM TAPER	
MERGING TAPER	L MINIMUM
SHIFTING TAPER	½ L MINIMUM
SHOULDER TAPER	⅓ L MINIMUM
TWO-WAY TRAFFIC TAPER	50 - 100 FEET MAXIMUM
DOWNSTREAM TAPER	100 FEET MAXIMUM

QUICK REFERENCE - "L" DISTANCE TABLE — MINIMUM LONGITUDINAL DISTANCE "L" (FEET) (ROUNDED VALUES)

POSTED SPEED "S" (MPH)	W=1	2	3	4	5	6	7	8	9	10	11	12
20	10	15	20	30	35	40	50	55	60	70	75	80
25	15	25	35	45	55	65	75	85	95	105	115	125
30	15	30	45	60	75	90	105	120	135	150	165	180
35	25	45	65	85	105	125	145	165	185	205	225	245
40	30	55	80	110	135	160	190	215	240	270	295	320
45	45	90	135	180	225	270	315	360	405	450	495	540
50	50	100	150	200	250	300	350	400	450	500	550	600
55	55	110	165	220	275	330	385	440	495	550	605	660
60	60	120	180	240	300	360	420	480	540	600	660	720
65	65	130	195	260	325	390	455	520	585	650	715	780
70	70	140	210	280	350	420	490	560	630	700	770	840

(Columns 1–12: LATERAL WIDTH "W" (FEET))

GENERAL NOTES

1- TABLE FOR "L" DISTANCE IS BASED ON CHANNELIZATION TAPER FORMULA FROM THE M.U.T.C.D. WHERE:

SPEED LIMIT	FORMULA
40 MPH OR LESS	$L_{MIN} = \frac{W \times S^2}{60}$
45 MPH OR GREATER	$L_{MIN} = W \times S$

L = MINIMUM TAPER LENGTH IN FEET (LONGITUDINAL DISTANCE)
W = WIDTH OF OFFSET IN FEET (LATERAL DISTANCE)
S = POSTED SPEED LIMIT, OR OFF-PEAK 85 PERCENTILE SPEED IN MPH PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED IN MPH

2- "L" DISTANCE IS FOR APPLICATION WITH CHANNELIZING DEVICE AND PAVEMENT MARKING TAPERS AND TRANSITIONS. CHANNELIZING DEVICES INCLUDE DRUMS, CONES, TUBULAR MARKERS, BARRICADES, RAISED ASPHALT ISLANDS, AND VERTICAL PANELS.

SHEET 1 OF 4 — 1101.11

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-12

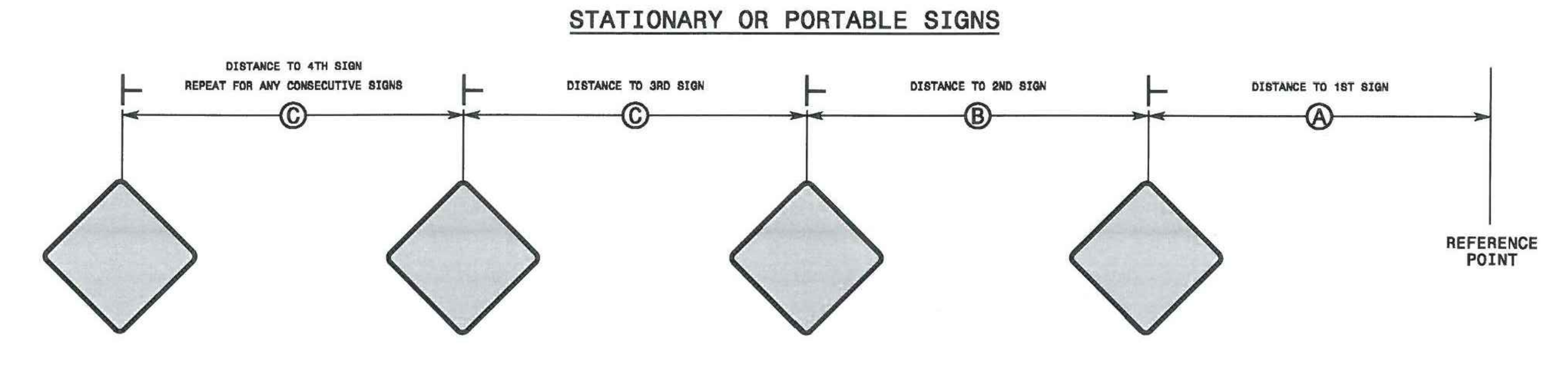
ENGLISH STANDARD DRAWING FOR **TRAFFIC CONTROL DESIGN TABLES** SPACING OF TEMPORARY SIGNS IN SERIES

DS MR

ADVANCE WARNING SIGN SPACING CHART

POSTED SPEED LIMIT (MPH)	RECOMMENDED DISTANCE BETWEEN SIGNS (FEET)± Ⓐ	Ⓑ	Ⓒ
≤ 35	200	200	200
40-50	350	350	350
55	500	500	500
CONTROLLED ACCESS ROADS (≥ 55)	1000	1500	2700

STATIONARY OR PORTABLE SIGNS



GENERAL NOTES

1- REFER TO 2009 MUTCD.

2- USE THIS STANDARD DRAWING IN CONJUNCTION WITH OTHER TRAFFIC CONTROL ROADWAY STANDARD DRAWINGS WHERE SIGN SPACING DISTANCES A, B, C, ARE SPECIFIED.

3- APPLY THE ADVANCE WARNING SIGN SPACING CHART WHERE A SERIES OF 2 OR MORE SIGNS ARE USED. ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE. FIELD ADJUST AS VARIOUS CONDITIONS OCCUR, SUCH AS LIMITED SIGHT DISTANCE, OBSTRUCTION INTERFERENCE, ETC.

SHEET 4 OF 4 — 1101.11

NORTH CAROLINA PROFESSIONAL SEAL 12634 ENGINEER MARK D. REICH
DocuSigned by: Mark D. Reich 58337FD49ADB4D7... 4/22/2015

REVISED : 4/17/15 - RELEASED FOR CONSTRUCTION

PROPOSED STREET & SIDEWALK IMPROVEMENTS FOR

TOWN OF ELON

ELON, NORTH CAROLINA
BOONE STATION TOWNSHIP, ALAMANCE COUNTY, NC

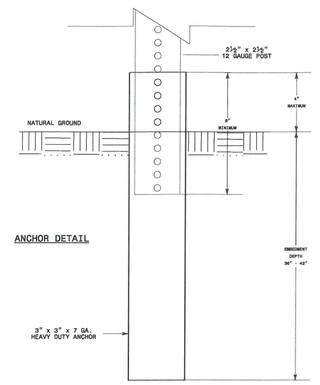
alley, williams, carmen & king, inc.
ENGINEERS, ARCHITECTS & SURVEYORS
740 chapel hill road, burlington, n.c. 27215 — p.o. box 1179, 336/226-5534
Firm's Engineering License No. F-0203

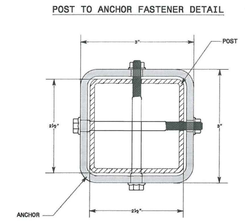
DATE: 1/16/14	TRAFFIC CONTROL DETAILS	JOB NO. 12190
DRAWN BY: WDF		DWG NAME: 12190DETAILS.DWG
CHECKED BY: MDR		SHEET NO. 16 of 17

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
STATIONARY WORK ZONE SIGNS
PERFORATED SQUARE STEL TUBING





GENERAL NOTES

1- POSTS SHALL BE 2½" X 2½" 12 GAUGE STEEL.

2- ANCHORS SHALL BE 3" X 3" 7 GAUGE STEEL.

3- CONNECTIONS SHALL BE AS RECOMMENDED BY THE MANUFACTURER.

SHEET 3 OF 3
1110.01

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-12

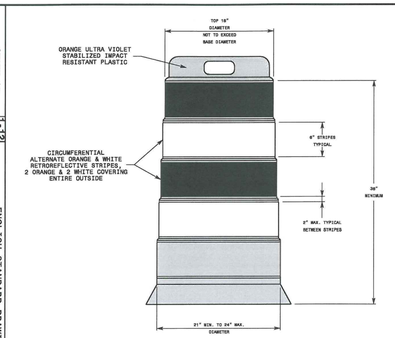
ENGLISH STANDARD DRAWING FOR
STATIONARY WORK ZONE SIGNS
PERFORATED SQUARE STEEL TUBING

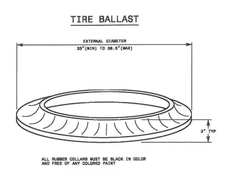
SHEET 3 OF 3
1110.01

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
DRUM





GENERAL NOTES

1- BALLASTING SHALL BE ACHIEVED BY THE SAND BAG, TIRE-SIDEWALL, OR PREFORMED WEIGHTED BASE METHODS. USE THE TIRE BALLAST AS SPECIFIED BY THE MANUFACTURER. DO NOT PLACE BALLAST ON TOP OF THE DRUM.

2- IF NECESSARY PLACE THE NAME OF THE AGENCY, CONTRACTOR, OR SUPPLIER ON NON-RETROREFLECTIVE DRUM SURFACES. SHOW THE LETTERS AND NUMBERS USING A NON-RETROREFLECTIVE COLOR AND NOT OVER 2" IN HEIGHT.

3- USE TYPE 3 OR HIGHER HIGH INTENSITY PRISMATIC SHEETING.

4- SEE THE DEPARTMENT'S APPROVED PRODUCT LIST AT https://apps.dot.state.nc.us/vendor/approvedproducts.

5- REFER THE STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES FOR ADDITIONAL INFORMATION.

SHEET 1 OF 1
1130.01

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-12

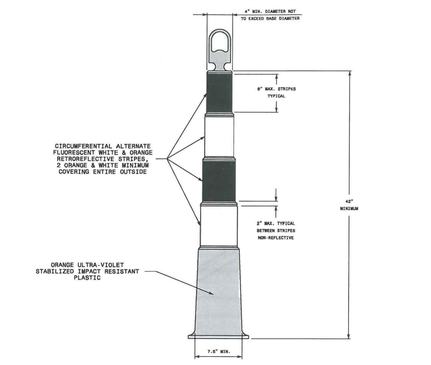
ENGLISH STANDARD DRAWING FOR
DRUM

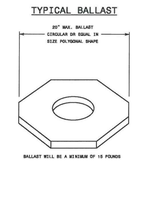
SHEET 1 OF 1
1130.01

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
SKINNY-DRUM





GENERAL NOTES

1- USE BALLAST AS SPECIFIED BY THE MANUFACTURER. DO NOT PLACE BALLAST ON TOP OF THE DRUM.

2- IF NECESSARY, PLACE THE NAME OF THE AGENCY, CONTRACTOR, OR SUPPLIER ON NON-RETROREFLECTIVE SURFACES. SHOW THE LETTERS AND NUMBERS USING A NON-RETROREFLECTIVE COLOR AND NOT OVER 2" IN HEIGHT.

3- REFER TO SECTION 1180, STANDARD SPECIFICATIONS FOR ROADS AND INSTRUCTIONS FOR ADDITIONAL REQUIREMENTS.

4- USE TYPE 3 OR HIGHER HIGH INTENSITY PRISMATIC SHEETING.

5- SEE THE DEPARTMENT'S APPROVED PRODUCTS LIST AT https://apps.dot.state.nc.us/vendor/approvedproducts.

SHEET 1 OF 1
1180.01

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-12

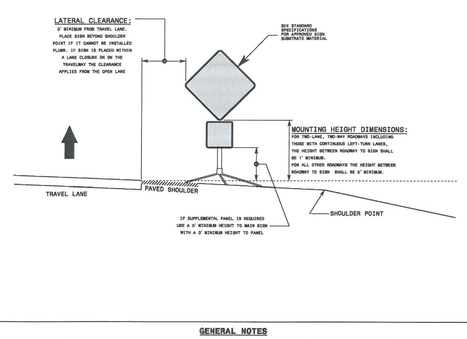
ENGLISH STANDARD DRAWING FOR
SKINNY-DRUM

SHEET 1 OF 1
1180.01

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
PORTABLE WORK ZONE SIGNS
MOUNTING HEIGHT & LATERAL CLEARANCE



GENERAL NOTES

1- DIMENSIONS SHOWN ARE MINIMUM VALUES. MOUNT SIGNS SO THEY WILL BE CLEARLY VISIBLE TO APPROACHING TRAFFIC EVEN WHEN SIGNS ARE MOUNTED BEHIND TRAFFIC CONTROL DEVICES SUCH AS DRUMS, BARRIER, OR OTHER OBJECTS.

2- ALL PORTABLE SIGNS AND STANDS MUST MEET OR EXCEED THE REQUIREMENTS OF NCHRP 350 FOR CATEGORY II DEVICES. USE PORTABLE WORK ZONE SIGNS AND STANDS SPECIFICALLY DESIGNED FOR ONE ANOTHER.

3- ALL PORTABLE WORK ZONE SIGNS AND STANDS MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST AT https://apps.dot.state.nc.us/vendor/approvedproducts.

SHEET 1 OF 1
1110.02

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-12

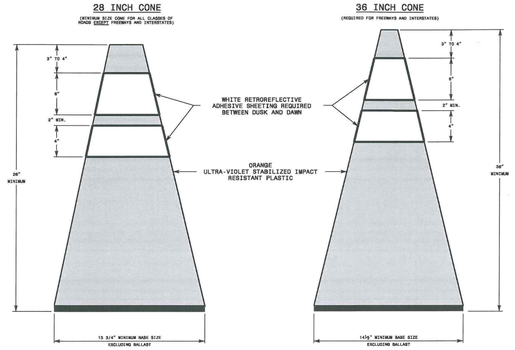
ENGLISH STANDARD DRAWING FOR
PORTABLE WORK ZONE SIGNS
MOUNTING HEIGHT & LATERAL CLEARANCE

SHEET 1 OF 1
1110.02

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
CONES



GENERAL NOTES

1- ACHIEVE BALLASTING BY USING SPECIAL WEIGHTED BASES SUCH AS SAND BAG RINGS, DOUBLING CONES, OR BASES THAT CAN BE FILLED WITH BALLAST. SEVENTY PERCENT OF THE WEIGHT OF THE CONE MUST BE IN THE BASE. USE BALLAST'S THAT DO NOT PRESENT A HAZARD WHEN STRUCK.

2-SEE THE DEPARTMENT'S APPROVED PRODUCTS LIST AT https://apps.dot.state.nc.us/vendor/approvedproducts.

3-USE TYPE IV OR HIGHER HIGH INTENSITY PRISMATIC SHEETING.

SHEET 1 OF 1
1135.01

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
CONES

SHEET 1 OF 1
1135.01

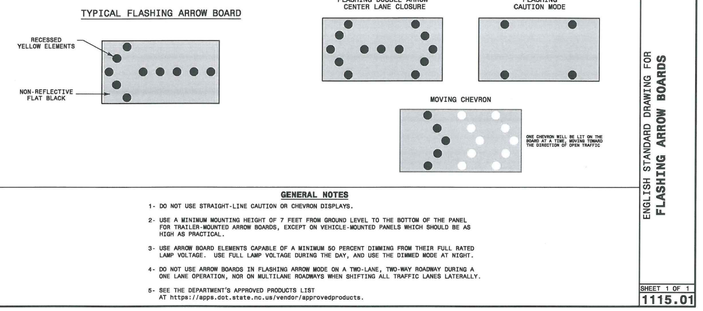
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
FLASHING ARROW BOARDS

FLASHING ARROW BOARD MODES

FLASHING ARROW BOARD TYPE			
PANEL TYPE	MINIMUM SIZE (W x H INCHES)	MINIMUM LEGIBILITY DISTANCE (MILES)	MINIMUM NUMBER OF ELEMENTS
C	96 X 48	1	15



TYPICAL FLASHING ARROW BOARD

GENERAL NOTES

1- DO NOT USE STRAIGHT-LINE CAUTION OR CHEVRON DISPLAYS.

2- USE A MINIMUM MOUNTING HEIGHT OF 7 FEET FROM GROUND LEVEL TO THE BOTTOM OF THE PANEL FOR TRAILER-MOUNTED ARROW BOARDS, EXCEPT ON VEHICLE-MOUNTED PANELS WHICH SHOULD BE AS HIGH AS PRACTICAL.

3- USE ARROW BOARD ELEMENTS CAPABLE OF A MINIMUM 50 PERCENT DIMMING FROM THEIR FULL RATED LAMP VOLTAGE. USE FULL LAMP VOLTAGE DURING THE DAY, AND USE THE DIMMED MODE AT NIGHT.

4- DO NOT USE ARROW BOARDS IN FLASHING ARROW MODE ON A TWO-LANE, TWO-WAY ROADWAY DURING A ONE LANE OPERATION, NOR ON MULTILANE ROADWAYS WHEN SHIFTING ALL TRAFFIC LANES LATERALLY.

5- SEE THE DEPARTMENT'S APPROVED PRODUCTS LIST AT https://apps.dot.state.nc.us/vendor/approvedproducts.

SHEET 1 OF 1
1115.01

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
FLASHING ARROW BOARDS

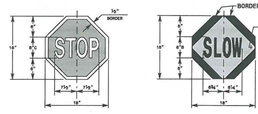
SHEET 1 OF 1
1115.01

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-12

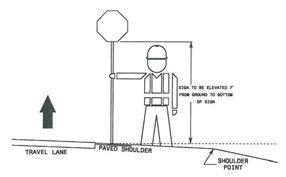
ENGLISH STANDARD DRAWING FOR
FLAGGERS

STOP/SLOW PADDLE



NOTE: FOR OPERATIONS THAT ARE RESTRICTED FROM DUSK TO DAWN ONLY, USE REFLECTORIZED LEGENDS, BORDERS AND BACKGROUNDS.

FLAGGER AND PADDLE PLACEMENT



GENERAL NOTES

1- USE HAND SIGNALING DEVICES SUCH AS STOP-SLOW PADDLES, FLASHLIGHTS TO CONTROL TRAFFIC. USE STOP-SLOW PADDLES AS THE PRIMARY DEVICE.

2- FABRICATE STOP-SLOW PADDLES FROM SHEET METAL OR OTHER LIGHT SEMI RIGID MATERIAL. PROVIDE A RIGID HANDLE OF SUFFICIENT LENGTH SO THE PADDLE IS HELD AT 7 FEET ABOVE GROUND LEVEL.

3- PROVIDE STOPPING SIGHT DISTANCE TO EACH FLAGGER STATION (REFER TO STD. 1101.11 SHEET 2).

4- ILLUMINATE FLAGGER STATIONS DURING NIGHT OPERATIONS.

5- FOLLOW FLAGGER QUALIFICATIONS AND METHODS OF HAND-SIGNALING PROCEDURES IN ACCORDANCE WITH PART VI OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

6- ALL FLAGGERS MUST BE CERTIFIED BY AN NCDOT APPROVED SOURCE.

SHEET 1 OF 1
1150.01

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
FLAGGING DEVICES

SHEET 1 OF 1
1150.01

PROPOSED STREET & SIDEWALK IMPROVEMENTS FOR

TOWN OF ELON

HAW RIVER, NORTH CAROLINA
HAW RIVER TOWNSHIP, ALAMANCE COUNTY, NC

alley, williams, carmen & king, inc.
ENGINEERS, ARCHITECTS & SURVEYORS
740 chapel hill road p.o. box 1179
burlington, n.c. 27215 336/226-5534
Firm's Engineering License No. F-0203

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12634 MARK D. REICH

Digitally signed by: Mark D. Reich
4/22/2015

REVISED : 4/17/15 - RELEASED FOR CONSTRUCTION

DATE: 1/16/14	JOB NO. 12190
DRAWN BY: WDF	DWG NAME: 12190DETAILS.DWG
CHECKED BY: MDR	SHEET NO. 17 OF 17

TRAFFIC CONTROL DETAILS